FOUNDRY TRADE JOURNAL

EST. 1902

VOL. 98
No. 2006

WITH WHICH IS INCORPORATED THE IRON AND STEEL TRADES JOURNAL

FEBRUARY 10, 1955

Registered at the G.P.O. as a Newspaper

Offices : John Adam House, John Adam St., London, W.C.2

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Established 1902

Vol. 98 Thursday, February 10, 1955 No. 2006

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AN INDUSTRIAL NEWSPAPERS PUBLICATION

Published Weekly

Single copy 9d.; by post 11d.;
Annual subscription: home 40s., abroad 45s. (prepaid).

JOHN ADAM HOUSE, ADELPHI, LONDON, W.C.2

'Phone: TRAfalgar 6171 (10 lines)
'Grams: Zacatecas, Rand. London.

Newer Foundry Processes

Over many years, the foundry industry has been from time to time aroused out of its lethargy by metallurgical developments—starting with "semi-steel," through "Perlit," aluminium-bronze, "Emmel," and "Alpax," to nodular irons. Late among these came the urge for mechanization, which has revolutionized an important section of the industry. The recent innovations—amongst which we include shell-moulding and the CO_2 process—are of greater interest, being neither metallurgy nor engineering, but purely foundry practice. Their fascination lies not only in their intrinsic novelty, but especially in the application of engineering and metallurgy in their development.

It is now established that both the shell-moulding and the CO_2 processes have in many cases reached the commercial production stage and indeed there is one example where the two systems have been married with very promising results. Queries are still rife as to the economic results to be derived, but it is at present very difficult to assess such benefits as the reduced floor-space occupied, and the lessened handling costs. There is one case on record, where, making heavy cores by the CO_2 process, seven crane-lifts were eliminated on each job and the cost of operating a large core-stove was eliminated. These new processes, like many of the older ones, call for service wires or pipes right up to the point of production. In this case, the ferrous founders could well emulate the more progressive of their non-ferrous brethren, by carrying pipes and cables underground. The outsize Sandslingers carry self-winding drums for the electric cables and this system should be capable of extension to the smaller portable plant used in foundries.

The advent of these new processes—and these include investment casting and other innovations—has had a profound influence on the engineer-buyer; he is becoming increasingly conscious of the close tolerances now available. In one case, a large engineering concern, more than pleased with the quality of shell-moulded castings, desired substantially to increase its intake. The supplying foundry, being worked to capacity in the shell-moulding section, suggested the sending of a mixed batch, to include the conventional type, and secretly marked as to the method used in manufacture. The buyer was unable to detect any difference, but it should be borne in mind that this particular firm has a very high reputation for the excellence of its repetition castings. Here, by emulation, is an opportunity for foundries to gauge the quality of their normal production. If such a high standard be obtained that they compare with those of the newer processes, then and then only can proper relative costs be truly ascertained. It is futile to compare the cost of turning out a better-quality casting with "run of mine."

Correspondence

CORROSION IN THE HOME

To the Editor, of the FOUNDRY TRADE JOURNAL.

SIR,—I was very interested to read the Leader in your issue of January 27 which referred to the exhibition "Corrosion Prevention in the Home," and felt myself particularly in agreement with the remarks at the beginning of your last paragraph stressing the importance of familiarity with corrosion mechanism. I was a little disturbed, however, by the dogmatic statement made to you by a young scientist—"Aluminium alloys should not be used in plumbing systems." At the risk of being classed with Orwell's pigs I suggest that he should have said—"Aluminium alloys should not be used in plumbing systems unless correctly installed."

It is well known that certain domestic waters at normal temperatures, and if static or slowly moving, can cause serious pitting corrosion of aluminium and its alloys and, indeed, the British Non-Ferrous Metals Research Association has in train an important investigation of this phenomenon, which has already yielded informative and promising results. Whilst in the present state of knowledge we should not recommend aluminium-alloy pipe for use unprotected with many domestic waters, unless the system were re-circulatory and an inhibitor could be added to the water, yet it must not be forgotten that there are perfectly satisfactory items of aluminium plumbing systems in service at the present time.

The Aluminium Development Association has had installed at its headquarters for six years cast-aluminium-alloy flushing tanks, both unprotected and painted inside with bituminous paint, all of which, despite some attack on the unprotected ones, are still in useful service and show no sign of failure even where copper fittings are used. A cast aluminium/magnesium-alloy tap, anodized, has also been in service for six years and shows no signs of attack at all; it is attached to a hot-water pipe of galvanized steel. On the other hand, we are aware of numerous failures of flush pipes in aluminium-alloy due to corrosion by water, and the attack is usually associated with fairly high copper contents in the water, derived principally from copper fittings.

I think this brief note illustrates the truth of your own comment that the avoidance of corrosion is by no means simply a matter of choice of material, but that avoidance of unsuitable installation practice, involving such things as dangerous bi-metallic contacts, is equally important. In this country and abroad there is considerable interest in the possibility of using aluminium or a suitable alloy for water services and the results of researches and service trials are awaited eagerly to see whether the good promise they show will, in fact, enable the remaining problems to be overcome. This is no time, therefore, for dogmatic statements to be made either way, especially as such statements may prejudice the acceptance of aluminium applications for which it is currently suitable, such as irrigation pipes.—Yours, etc.,

E. ELLIOTT,
Metallurgist.

Aluminium Development Association,
33 Grosvenor Street,
London, W.1.
February 7, 1955.

BYRON HORTICULTURAL ENGINEERING, LIMITED, of Hucknall, is building a new factory in Watnall Road, Hucknall, near Nottingham, expected to be ready for production in March. It will have floor space of more than 25,000 sq. ft.

Mond Nickel Fellowships

The Mond Nickel Fellowships committee now invites applications for the award of Fellowships for 1955. The main object of these is to enable selected applicants of British nationality and educated to University degree or equivalent standard to obtain additional training and wider experience in industrial establishments, at home or abroad, so that if they are subsequently employed in executive or administrative positions in the British metallurgical industries, they will be better qualified to appreciate the technological significance of research and to apply its results.

There are no age limits, though awards will seldom be made to persons over 35 years of age. Each Fellowship will occupy one full working year. It is hoped to award five Fellowships each year of an approximate value of £900 to £1,200 each. Applicants will be required to define the programme of training in respect of which they are applying for an award, as well as particulars of their education, qualifications and previous career. Full particulars and forms of application can be obtained from the secretary, Mond Nickel Fellowship Committee, 4, Grosvenor Gardens, London, S.W.1. Completed application forms will be required to reach the committee not later than June 1.

Using Fuel Wisely

That the economic prosperity of Britain depended on abundant supplies of cheap fuel was the opinion put forward by Mr. R. H. Rowse, B.Sc., M.Inst.F., technical director of Smith & Wellstood, Limited, when he addressed Falkirk Rotary Club at the end of last month. He said that the position to-day was such that the available fuels had to be used wisely, and there was ample scope for the more intelligent use of fuel. All fuels, with the exception of oil and power, were coals or coal derivatives. Coal, however, was a declining asset. He referred to various methods of making use of coal, and said that the manufacture of gas left a residue of coke and tars which were of value as raw materials for chemical manufacturers. Electricity, Mr. Rowse said, was a really high-grade fuel, but it suffered from several disadvantages. There was a large loss of heat, power and energy at the power stations, only 20 to 30 per cent. of the fuel burned coming out as electricity. Another disadvantage was that electricity could not be stored satisfactorily. Other aspects dealt with included the use of atomic energy, domestic fuel-burning, and atmospheric pollution.

Luncheon

FOUNDRY TRADE JOURNAL

Mr. Y. R. W. Granström, the president of the International Committee of Foundry Technical Associations, was the chief guest at a luncheon held in a London Club, this week. The occasion was a meeting of the past-presidents of the Committee. Included among the guests were Mr. A. Brizon; Mr. J. Léonard; Mr. V. Delport and Mr. G. Lambert, the honorary secretary. Mr. V. C. Faulkner presided.

THE FIRST big shipbuilding order for the Clyde this year has been placed with the Port Glasgow firm of William Hamilton & Company, Limited. It is to build two 9,500-ton cargo motorships for the Hain Steamship Company of London. The vessels will be similar to one already being built by the firm for the same owners.

"Pop-off"-type Moulding Boxes for the Mechanized Production of Light Castings*

By A. J. Crook

Description of the full mechanization of a foundry where previously loose-pattern moulding methods had been used. The "Pop-off"-type moulding box has been used to advantage by adapting it to cope-and-drag plates. The castings produced, both in grey iron and whiteheart malleable iron, are mainly for the builders' ironmongery and furniture trades, but small castings of all types are manufactured for the bicycle, textile, electrical and other trades.

The majority of castings made in the foundry to be described are in the weight range of ½ to 8 oz. and Fig. 1 shows a typical selection. Over a period of 40 years, prior to the installation of the mechanized plant, very little change or progress had been made in the production of this class of casting in the foundry. The castings were produced on hand-squeeze moulding machines, using wooden snap-flasks, the patterns being "sprayed up" on plaster oddsides. Until the recent war, plenty of skilled moulders were available and the daily production was between 60 to 90 boxes per man, each man casting and breaking-open his own moulds. After the war, a serious shortage of skilled labour was encountered and other methods of production were sought.

Various problems associated with mechanized production had to be considered and the design of the plant and moulding equipment was carried out with these factors in mind. It was necessary that the high quality of the castings be maintained, particularly in regard to skin finish, as a large proportion of the production is barrelled, plated and polished in the finishing processes; in this respect, cross-jointed castings could not be tolerated. High-speed production of moulds was needed to keep up with continuous melting as, in some cases, the moulds contain only 2 lb. of castings.

The following were the essentials decided upon:—(1) Facing sand must be used; (2) patterns had to be very accurate and as cheap as possible, owing to the large numbers in use; and (3) the moulding technique also had to be accurate and utilize the box-less method.

It was decided to use moulding boxes of the "Pop-off" type (imported from Sweden) in conjunction with standard "pin-lift"-type moulding

* Paper read before the Birmingham branch of the Institute of British Foundrymen. The Author is foundry manager of the Shaw Foundry Company, Willenhall.

FIG. 1.—*Selection of the light type of grey- and malleable-iron castings produced at Shaw Foundry.*

FIG. 2.—*Design of "Pop-off" moulding box adopted.*

machines, the cope and drag being made separately because in this manner:—(1) Semi-skilled labour could be used; (2) faster production could be achieved; (3) more accurate pins and bushes could be used, as the moulder did not have to strip his own box; and (4) if both parts were to be squeezed at once, aluminium matchplates would have had to be used which, at that time (before the recent developments in the production of pressure-cast matchplates), were difficult and costly to produce.

"Pop-off" Moulding Boxes

The "Pop-off" moulding boxes used (Fig. 2) are made of magnesium alloy, fitted with steel wear-resisting strips; they open at two corners by means of spring cam actions and have four degrees of taper. The box measures 16½ by 12½ in. at the parting line and pins of unequal size are used, one being ¼ in. and the other ⅜ in. dia. The larger pin of the two is hexagonal and touches the bush at two points only; this, combined with a tolerance of 0.003 in. between pin and bush, makes the box easy to open and close but still retains accuracy. A daily check on these boxes is carried out by a patternmaker, the pins and bushes being gauged to find if there is any wear and new ones are fitted when necesary, also new corner fittings.

Moulding Machines

The moulding machines used are of the standard jolt-squeeze pin-lift type, although jolting of the moulds is unnecessary for the majority of castings produced. Where jolting is necessary, more substantial pattern equipment is needed. These machines are fitted with baseplates which are well tapered to keep the sand clear of the machine and incorporate an electric grid heater, with a switch at the rear. The baseplate on the machine used for the production of cope moulds is fitted with pins, the machine used for producing drag moulds being fitted with bushes (Fig. 3).

The patternplates are jig-drilled to fit on the baseplates as shown in the sketch, and no holding-down bolts are used. This method eliminates the need for pins and bushes to be fitted to every pair of patternplates and makes all patternplates interchangeable with every set of baseplates. A pattern change takes approximately one minute. The squeeze head of the machine used for the production of copes is fitted with a machined cast-iron plate on which caps with permanent magnets inside are fixed; these form the pouring basins. They can be moved about easily to suit the pattern on the machine at the time and to coincide with the position of small pegs fixed to the patternplate. The downgate of the mould is cut with a tube directly on to this peg. To ensure that no loose

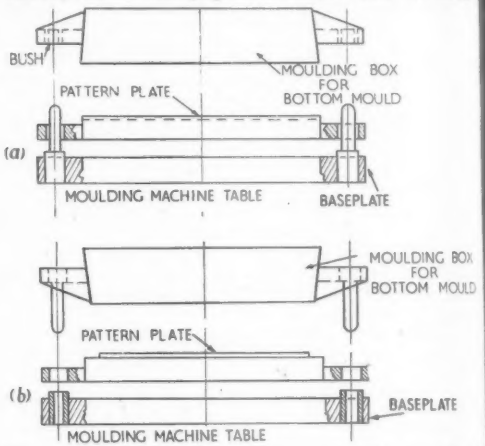


FIG. 3.—*Exploded view of the moulding-machine baseplate and moulding-box equipment (a) for top-part moulds and (b) for bottom-part moulds. The patternplates are not fitted with pins or bushes, the moulding boxes engaging and locating on the baseplates.*

FIG. 4.—*Patterns being sprayed with liquid parting medium at the commencement of the operational cycle of mould making. The corner assembly of the "Pop-off" moulding box is clearly shown in this illustration.*

sand is left behind, the tube and the peg are of the same diameter.

Operation of Machines

The following is the operational sequence of mould production:—

(1) The moulding box is put on to the machine and the patterns sprayed or dusted (Fig. 4).

(2) Facing sand from the large cylindrical "shovel-out" hopper is riddled on to the pattern (Fig. 5).

(3) The box is filled up with backing sand from overhead hopper (Fig. 6).

(4) The moulds are squeezed and stripped and the gates are cut. The moulder of the drag-half inserts a magnesium-alloy bottom board, before squeezing (Fig. 7).

(5) The moulder of the drag-half turns his mould over on to a small table set between the machines.

(6) The cope-half moulder closes his part on to the drag-half (Fig. 8).

(7) The spring corners of the "Pop-off" box are then released, the mould is removed to a continuous pallet-conveyor and the "Pop-off" box is closed and parted ready for the next mould-making cycle.

All these operations have been reduced to the very minimum number of movements necessary to produce the mould and good production figures are achieved. A normal 44-hour, five-day week is worked on the plant and the average number of complete moulds produced per pair of machines (two men) is 600 per day, which, allowing for tea breaks, is 75 per hour. It is realized that the use of facing sand prolongs the operations, but this is necessary to meet the high finish required for the class and variety of castings produced.

Patternmaking Methods

From the original master pattern, run-off patterns are made in brass or white metal, double the quantity required for the mould being produced. Thus, if there be 12 patterns in the box, 24 are moulded. All are dressed-up carefully and set in a plaster block to ensure they are identical. Then, 12 of the patterns are sprayed-up to runners and set in a plaster oddside exactly as it is intended to produce the castings (see Fig. 9). Preliminary moulds can then be made to try out the gating and running system and, if necessary, changes can be made at this stage, this being a great advantage over other patternmaking methods.

From this plaster oddside, a very hard-rammed sand mould is produced in a master moulding box. After ramming, the box is opened and the two halves laid face open, leaving the set of patterns used already lying in one side of the mould. The plaster oddside is then discarded, the duplicate set of patterns being brought into operation and laid in the impressions in the other half-mould.

FIG. 5 (ABOVE).—*Facing sand being shovelled from a large cylindrical hopper for riddling on to the patternplate.*

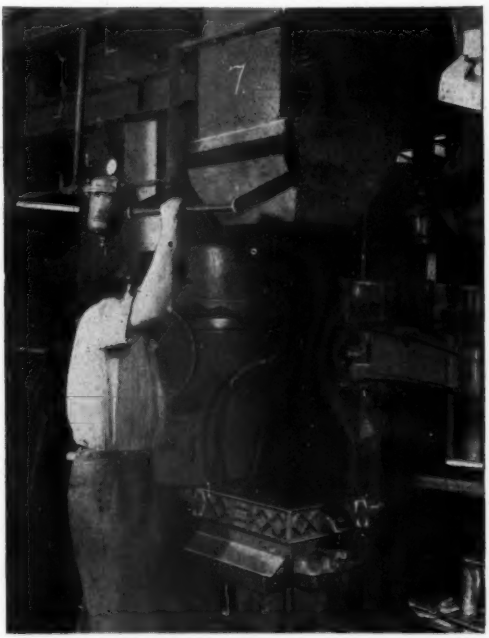


FIG. 6.—*Moulding box being filled with backing sand from a hopper overhead.*

FIG. 7.—*Pair of moulding machines (cope and drag) in the "squeeze" position; a magnesium-alloy bottom "board" is inserted in the drag-half before squeezing.*

A pair of machined cast-iron frames, already jig-drilled, are placed over the half-moulds, ready for pouring in the proprietary pattern-stone (Fig. 10). Small brass wires are soldered on to the protruding patterns to key the patterns securely into the pattern-stone. When set, the patternplates are ready for being put into production, after cleaning and painting (Fig. 11). In some cases, where the pattern is simple or flat backed, one side of the plate is produced entirely in the pattern-stone. A good banking or stepped joint is made all around the mould to ensure good keying of the two halves. This keying is the largest single factor in the production of accurate castings and is important to avoid cross-joints in the handling of the moulds, when the "Pop-off" box has been removed.

This method of producing cope-and-drag plates has proved successful for the class of work produced, and such patterns can be jolted on moulding machines if a more substantial pattern-stone is used. The moulding method described is used largely in the foundry and five pairs of machines are operated in this way. Double-sided plates are used in conjunction with both "Pop-off" boxes and wooden snap-flasks; steel boxes are also used. Some hand-squeeze machines are still used in the foundry for jobs where smaller quantities are required.

MECHANIZED PLANT

The mechanized plant in the foundry was designed to incorporate the use of facing sand and is built around six cylindrical hoppers which hold five tons of sand each; these are available to both the grey and malleable sections of the plant (see Fig. 12).

Sand Systems

The sand plant is housed in a separate building situated at the extreme end of the foundry. Facing sand and backing sand are delivered over the same conveyor belt at different times, the facing sand being milled during the lunch-time break and after ceasing production at night. This is stored in the cylindrical facing-sand hoppers adjacent to the moulding machines, each hopper serving four moulders.

Preparation of Facing Sand.—Sand is withdrawn from the main 20-ton storage hopper into the screw-type paddle-mixer, where new red-sand is added in a controlled flow from the red-sand hopper. Coal-dust and clay are added by vibratory feeders and this pre-mixed facing sand is delivered to a hopper above the skip of the ½-ton-capacity roller-type batch mill. This hopper is fitted with a rotating disc; sand is ploughed off into the skip hoist and the

FIG. 8.—*Closing a completed mould on a small frame table between the machines; afterwards the "Pop-off" box is released and removed, the mould being transferred to a pallet conveyor.*

FIG. 9.—*Patterns set in a plaster odd-side, and completely sprayed-up to runner bars. From this odd-side a mould is made and production patternplates cast.*

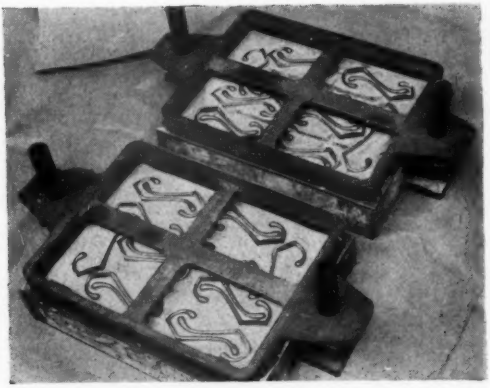


FIG. 10.—*Pair of machined and jig-bored cast-iron frames in position over half moulds, ready for pouring-in the proprietary pattern-stone. Brass wires are soldered on to the protruding patterns for keying into the stone.*

mill is filled (See Fig. 13). After milling, the sand is discharged on to the conveyor belt under the door of the mill and delivered, after aerating, to the facing-sand hoppers in the foundry. By adjusting the rate of discharge from the main storage-hopper, a continuous process can be achieved and the skip filled whilst a batch of facing sand is mixed and discharged. The necessary addition of water is made at the mill by an automatic meter.

A local natural red-sand is used and delivered to the foundry in the normal pulverized condition. The miling time has been cut down (because of the pre-mixing of the sand) to approximately 2½ min. A careful check is made on the sand and properties are maintained of the order of:—Moisture: 5 to 5.5 per cent.; green-strength: 7 lb. to 8 lb. per sq. in.; shatter index: 70 to 75; and permeability: 23 to 26. The new red-sand addition is 10 per cent.

Backing Sand

Water is added to the backing sand in the paddle mixer and is the only addition made. This sand

FIG. 11.—*Set of finished patternplates ready for being put into production in the foundry.*

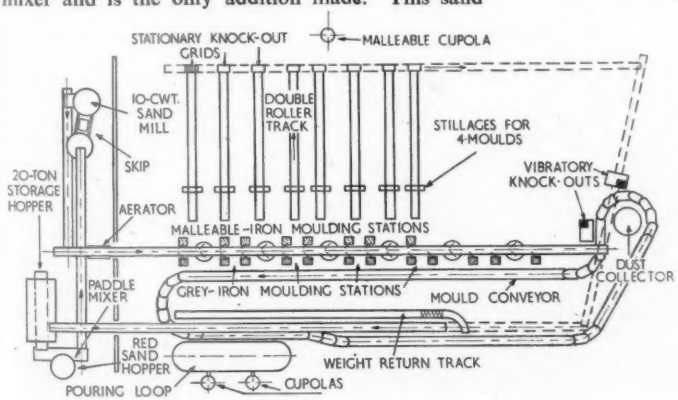


FIG. 12.—*General layout of the mechanized plant at Shaw Foundry.*

follows the same course as the facing sand but is not milled at all, the batch mill being eliminated from the cycle by closing the plough over the skip-hoist and opening that over the foundry feeder belt. These ploughs are pneumatically operated. The backing sand is diverted by ploughs into the hoppers located directly over the moulding machines.

FIG. 13 (ABOVE).—*Skip bucket of the roller-type mill being filled with pre-mixed facing sand ready for milling.*

This sand system, without the backing sand being milled, has proved quite satisfactory, for the light castings produced and is, in actual fact, only a mechanized version of the methods used when a moulder had his facing sand milled for him and reconditioned his own backing sand, thus the essential features of sand preparation have not been changed. Little bond is burned out of the sand and simple and rougher types of castings have been produced without facing sand.

The backing sand gives the following test figures:—Moisture: 4.5 to 5 per cent.; green-strength: 6 lb. to 7 lb. per sq. in.; permeability: 27 to 33; and shatter index: 50 to 55.

Grey-iron Melting Practice

The grey iron produced is a soft, machinable grade having the following percentage composition:—Total carbon: 3 to 3.3; silicon: 2.8 to 3.0; sulphur: 0.10 to 0.15; phosphorus: 1 to 1.3; and manganese: 0.5 to 0.7.

The two cupolas, which are lined to 24 in. dia., are operated on alternate days; they are charged by skip-hoist from ground level, the metal being loaded previously into a tipping bucket suspended from an overhead monorail (See Fig. 14). One man charges approximately 11 to 12 tons per day, and includes in his duties the breaking of pig iron and scrap. Each charge is of 5 cwt. and the metal to coke ratio is 10 : 1. Spark arrestors are fitted to the cupolas. Continuous melting is carried out, with syphon-brick tapping, the syphon bricks being made from ganister by the cupola operators.

Casting

On the grey-iron plant, four men are employed for pouring, using ladles of approximately 60-lb. capacity, suspended from a monorail. These suspended hand-shanks have cranked handles which give good control over the casting operation, as can be seen in Fig. 15. It has recently been decided to instal a receiver, to overcome the timelag in filling the hand ladles direct from the cupola spout. The mould conveyor moves at approximately 16 to 18 ft. per min., this being the maximum speed at which pouring can be carried out efficiently and comfortably. Weights and jackets are placed on the moulds before casting; they are removed afterwards and returned by roller conveyor. Mould jackets are used only when necessary.

Knock-out

The knock-out has proved to be quite a problem, due to the high sand-to-casting ratio. Because of the small size of castings, a narrow mesh has to be used and the vibrations of the knock-out damped

FIG. 14.—*Loading the tipping bucket—suspended through a dial-type weigher—with the cupola charge. The bucket travels along in front of the stock bins and tips its load into the bucket of the inclined cupola-charging hoist.*

down to prevent the castings from breaking away from the runner-bar. With such a narrow mesh and low amplitude vibration, it is difficult to get all the sand through sufficiently quickly. A compromise, therefore, has to be made and only by quick movements do the operators prevent a large number of castings finding their way to the magnetic separator. Recently, to cope with extra output, a second knock-out has been installed to increase the throughput of sand to the main return conveyor. The output of the grey-iron section of the plant is approximately 26 to 28 tons per week, with a total of from 10,000 to 11,000 moulds.

Malleable-iron Production

The second row of machines on the mechanized plant is used for the production of malleable-iron castings, the sand being drawn from the same system. Moulds are made by similar methods to those used for grey-iron production but they are placed on stillage tracks for casting. Each stillage carries four moulds and runs along double rollers, just above ground level, to facilitate pouring from hand shanks (see Fig. 16). This illustration shows a pair of pin-lift machines in the background and two sets of double roller-track, in the foreground, on which are placed the moulds produced by the two moulders. There is room for four moulds per stillage, there being approximately 160 moulds laid out before the moulders—who do their own casting—start to pour their moulds.

There are two melts daily and the approximate production from two men is 360 moulds per day. A third man is employed moving the weights, and

FIG. 15.—*Pouring in progress in the grey-iron section of the plant, using 60-lb. capacity suspended hand-shanks.*

jackets, and knocking-out all the boxes over the stationary floor-grids. Afterwards, this man returns the bottom-boards and steel stillages to the moulders and knocks off the castings from the runners. As

(*Continued overleaf at foot of col.* 1)

FIG. 16.—*Pouring in progress in the malleable-iron section of the mechanized plant at Shaw Foundry.*

Sandwich Technology Courses

Birmingham College Undertaking

Birmingham College of Technology is undertaking pioneer work in the field of higher technical education, which is of interest to the foundry industry. A new project has been devised in the form of a "sandwich course" of practical and theoretical studies to enable youths of good education to become engineers capable of filling responsible technical, administrative, and sales positions in industry.

The scheme by-passes degree courses at a university and aims to give young men an equivalent theoretical grounding, together with the advantage of long periods in a factory and in production engineering. The General Electric Company, Limited, has co-operated with the College in launching a pilot course and at present over 50 student trainees of the GEC are taking the first year of the course at the College. A full scale scheme open to industry as a whole is to start in September when the number of "sandwich" students is expected to rise to 150. An eventual target of 800 is envisaged for the four-year course. During the programme course the youth will alternate full-time sessions of six months at the College with six months of industrial training. The scheme has been designed to meet the need for a new type of course combining theory and practice and to ensure to industry a supply of the trained technical capital it so urgently needs.

Further "50-50 Rule" Protest

The Minister of Transport and Civil Aviation has undertaken to give the fullest consideration to the views of a deputation of the General Council of British Shipping, which visited him on February 2, concerning shipowners' protests against the extension of the "50-50 rule" to cargoes arising from what they term "trade" transactions. The American "50-50 clause," requires that half of all American aid cargo be carried in American ships.

Explaining that the rule had until recently applied to "gift" and "aid" cargoes from the United States, Mr. H. Leslie Bowes, chairman of the council, who led the deputation, said that the extension was viewed with considerable alarm by the shipping industry. Coal and apples had recently been bought in America by the British Government and paid for in sterling, and the Government had agreed that the 50 per cent. rule should apply in these cases.

"*Pop-off*"-type Moulding Boxes

(*Continued from page* 147)

much pouring as possible is done from double hand-shanks, but on some of the very light work, single hand-shanks have to be used.

Using the same floor area as before mechanization and an equivalent labour force, the production of casting has increased by 200 per cent. The aim throughout has been to simplify all working methods and to minimize effort by studying all the operations, thus effecting an overall economy.

In conclusion, the Author wishes to thank the directors of Arthur Shaw & Company, Limited, and the Shaw Foundry Company, for permission to present this Paper.

Large Firms Management Problems

Fostering Good Relations

A way of creating and fostering a good relationship within the group must be found by large firms, said Mr. E. L. G. Robbins when he addressed members of the London Chapter of the Institute of Internal Auditors. And to achieve that, Mr. Robbins, who is organization adviser to the Ford Motor Company, Limited, said that each functional supervisor or manager at whatever level in the organization must himself be trained and capable of dealing with the people under his direction.

The speaker said the subject of management was simplified if it was classified under the following four headings:—(1) Forward Policy Planning (the determination of forward policy and the planning of products and manufacturing facilities); (2) Organization (organization of personnel to provide for channels of communication and delegation of authority); (3) Control (the control of operations against the original plan); (4) Implementation (the handling of people to provide for motivation and co-ordination).

The adoption of this classification in our thinking would enable us to reduce the complexity of the management problem by separating those facts which might be solved by the ordinary logical approach, thus leaving a smaller residue concerning the far more complex mental processes involved in the art of motivation and co-ordination of people. And Mr. Robbins also felt that such an approach to the management problem assisted in achieving low costs of production, competitive prices, and, in consequence, maintaining full employment of labour.

Brassfounders' Advisory Service

Brassfounders in the Lancashire and Cheshire area are invited to a meeting at which "Foundry Layouts" will be discussed. It is to be held by the Association of Bronze & Brass Founders at the Engineers' Club, 17, Albert Square, Manchester, on Monday, March 7, commencing at 7.15 p.m. The proposal is to discuss actual foundry layouts submitted by founders. A number of plans of foundries have been provided by firms in the London and Midland areas, but to assist and enlarge the discussion and to cover local conditions it is desired to have plans of foundries in the Lancashire and Cheshire area. To this end, contributions from local founders would be appreciated. The identity of the foundries will not be disclosed. Copies of the plans will be sent before the meeting to those firms which have notified the secretaries—Heathcote & Coleman, 69, Harborne Road, Edgbaston, Birmingham—of their intention to send delegates to the meeting.

Revolving Refractory Chart

Just as no particular make or type of firebrick is suitable for all conditions, so does the type of refractory concrete, or even its suitability, vary, according to the particular conditions prevailing. To help those firms making their own mixtures to be certain that the mix they are using is the best possible one in each circumstance, the Lafarge Aluminous Cement Company, Limited, 73, Brook Street, London, W.1 (manufacturers of Ciment Fondu aluminous cement), have produced a revolving refractory chart which shows at a glance the various uses for refractory concrete, the most suitable aggregates, suggested mixes, and also the hot-face temperatures which such mixtures should withstand. Copies may be obtained on writing to Brook Street.

Notes from the Branches

Newcastle-upon-Tyne

A very good attendance of members and visitors at a recent meeting of the Newcastle branch of the Institute of British Foundrymen welcomed Mr. John Bell, president of the Institute, and Mr. G. Lambert, general secretary, who attended the meeting by invitation. MR. C. W. STEWART, branch president, was in the chair and, on behalf of the members, extended a hearty welcome to the visitors, particularly mentioning their pleasure in having the company of Mr. Bell and Mr. Lambert.

MR. BELL, in replying, thanked the branch for their invitation to the meeting and said that although his attendance in Newcastle necessitated his absence from a Scottish branch meeting—his first "black mark" in 31 years—he was recompensed by the fact that, of all the branches, the defection should be to Newcastle, Scotland's nearest neighbouring branch, and one with which there had always been a spirit of friendliness and co-operation. He was well aware of the good reputation the branch enjoyed and hoped that the members would continue to be worthy of the Institute and maintain the traditions of those who had gone before.

MR. LAMBERT expressed his appreciation for the opportunity of accompanying the president to Newcastle, of which he was a native. He spoke of the continued progress of the Institute and thanked the branch members for the part they had played in its development, expressing the hope that they would continue to do what lay in their power towards further progress.

THE CHAIRMAN then invited questions on general foundry topics with a view to encouraging discussion. Subjects ranged from casting defects and the recent regulations regarding foundries, to shell-moulding and improvements in the design of castings from the foundryman's point of view, and a good general discussion followed.

The meeting concluded with a vote of thanks to the visitors, proposed by Mr. Colin Gresty, which was confirmed with acclamation.

Bristol and West of England

An interesting meeting took place during November at the works of T. H. & J. Daniels, Limited, of Stroud, Glos, when Mr. W. B. Lawrie, MBE, spoke on factory regulations, and showed films dealing more especially with dust and fume control in foundries. In the discussion that followed many members expressed concern at the recommendations made in the Foundry Regulations in respect of protective clothing. They wondered how foundry personnel could be persuaded to use eye protectors when it was often difficult to see through these owing to condensation, while dark glasses, although reducing glare from molten metal were not conducive to confidence if the operator was compelled to wear such goggles when carrying metal about the shop. Mr. Lawrie said that however difficult a matter it might be, the foundry personnel must be trained to take advantage of protective clothing, eye protectors, etc., which are intended to ensure that maximum personal safety is obtained under normal working conditions. Following the meeting, members were entertained to tea by kind permission of the management of T. H. & J. Daniels, Limited.

On December 4, a party of nearly 60 members and friends paid an interesting visit to the works of Stothert & Pitt, of Bath, by kind invitation of the management. Members were conducted around the works in small parties and had ample opportunity to see the many aspects of engineering work carried out by the hosts. Members were fascinated by the detail involved in the building of dockside cranes, several of which were in the course of erection. Elsewhere, massive gear wheels and the gear-cutting equipment used caused much interest, the quality of the bronze castings seen received praise from all members. The foundry, in which castings of all types for the general engineering work used in the works are made, proved of great interest to many of the visitors, who being accustomed to batch production of castings of small size were amazed at the size of some of the individual castings made on the "one off" system. After an interesting tour of both of Stothert & Pitt's Works, the party sat down to a very enjoyable tea kindly provided by the management.

Lancashire

The annual dinner and dance of the Lancashire branch in Manchester on January 29, with the president, Mr. E. Jackson, in the Chair. Following the "Loyal Toast," that of the Lancashire branch was proposed by Mr. John Bell, the national president of the Institute. In his remarks, MR. BELL spoke humorously of the good-natured rivalry which existed between Lancashire and Yorkshire, and recalled that Lancashire had established the first branch of the Institute and thus set-up the pattern of branch organizations, which had been adopted ever since.

MR. E. JACKSON replied, and MR. A. KIRKHAM, the senior vice-president of the branch, toasted "The Visitors." He mentioned by name (in addition to Mr. Bell) Dr. A. B. Everest and Mr. H. J. V. Williams (senior- and junior-vice-presidents of the Institute respectively); Mr. Lambert; Mr. G. Mundell (past chairman of the Association of Bronze and Brass Founders); Mr. Mortlock (representing the ironfounding industry and president of the Manchester and District Ironfounders' Employers' Association); and Mr. Massey, of B. and S. Massey, Openshaw, Manchester. MR. MUNDELL replied; MR. R. L. HANDLEY (past-president, Lancashire branch) toasted "The Ladies," and MRS. E. JACKSON responded.

At this juncture, there was a presentation to Mrs. Jackson, by Mr. Bernard Gale, on behalf of the branch, after which MR. W. S. SPENCELEY (junior vice-president of the branch) proposed a vote of appreciation to the branch secretary, Mr. F. W. Nield.

Much credit for the successful organization was due to the hon. social secretary, Mr. A. Kirkham, and his committee.

Beds and Herts Section

About 90 members and guests attended this session's "Men-Only" dinner of the Beds and Herts section of the London branch of the Institute of British Foundrymen. It was held at the end of last month at the Royal Hotel, Luton, with Mr. E. Daybell, section president, in the Chair. After the Loyal Toast it was Mr. Daybell who proposed that of "The Visitors," and Dr. A. Ivanhoff (Hayward Tyler & Company, Limited) responded. The toast of "The Section" was given by Mr. W. Wilson, president of the London branch, and Mr. W. F. Hammond replied. A very enjoyable evening concluded with light entertainment. The event was very ably organized by Mr. W. Twaddle, section secretary.

Centenary of Aluminium

A progress exhibition is to be held from June 1 to 11, at the Royal Festival Hall, London, by the aluminium industry of this country. It will not only mark the centenary of aluminium as a commercial metal but will demonstrate, convincingly, how the present vast output and experience already gained are now being applied to every great industry in increasing measure. It was at the "Paris Exposition" in 1855 that the French scientist, Professor St. Claire Deville, who had succeeded in extracting aluminium from clay by a chemical process, exhibited samples of the metal. Aluminium was rated a precious metal, since it cost £60 per pound to produce. The first article to be made of the new metal was a rattle for the child of the Emperor Napoleon III, who ordered aluminium cutlery to replace the gold plate at the Tuileries banquets. An aluminium watch-chain was also presented to the King of Siam, when on a State visit to France. Attracted by its light weight, the Emperor commissioned Deville to produce aluminium on a large scale so that, with its cost reduced, it could be used for equipment for his soldiers. However, only 10 tons of aluminium were produced in the whole world in the following 10 years, its lowest price being £3 per lb.

In 1866, two scientists, Charles Martin Hall in America and Paul Héroult in France, working independently, simultaneously patented the electrolytic process for extracting aluminium from its oxide. To-day, using basically that same method of extraction, 30,000 tons of pure aluminium are produced in Britain alone, at the hydro-electric plant in the Scottish Highlands, and world production in 1954 has probably exceeded three million tons and is still increasing. From £144,400 per ton its price is now £165 per ton and aluminium has the distinction of having increased in price to a less extent than any other important commodity.

In 1907, came the discovery by a German scientist, Alfred Wilm, that by alloying small quantities of other metals with aluminium, its strength could be greatly increased. Further research and development in this country produced a wide range of alloys which made possible the development of the aircraft industry and of the internal-combustion engine. The aluminium industry has indeed been built on research, and every alloy has been developed to exacting standards of uniformity and reliability.

Recent Developments

The ten years that have followed the last war have been years of remarkable progress, and research results have been applied to problems in every industry. First came the aluminium prefabricated house, 70,000 of which were built; to be followed by the adoption of aluminium in permanent building construction. In shipbuilding, its success was never more strikingly demonstrated than by the great American liner United States, which has over 2,000 tons of aluminium in her superstructure, lifeboats, and many fitments. Less spectacular applications of aluminium to ships had already become a commonplace in Britain. The world's first aluminium bridges have been built in Britain and aluminium coaches of London's Underground trains, and aluminium bus-bodies on London's streets, provide ample evidence of the faith of the engineer in aluminium.

Its light weight and its resistance to corrosion, symbolized by Gilbert's famous aluminium statue of "Eros"—now more than 60 years old—have made this the light-metal age. If the progress, especially in the past ten years, has been remarkable it is still only a beginning: for the future of aluminium offers boundless possibilities, it is considered.

(*Continued at foot of Col.* 2)

Smokeless Air with an Open Fire

An exhibition opened at Charing Cross Underground Station on February 1, is timely in view of public and Parliamentary sensitivity to the need for cleaner air. The frontispiece, an outsize brazier burning solid smokeless fuel, is an open invitation to step inside and learn the drill for getting the best out of the latest weapons against polluted air. Once inside, six modern solid-fuel appliances burning smokeless fuels, and arranged in pleasing and appropriate settings, greet the visitor, together with a display of the range of solid smokeless fuels. There are officials to answer questions and leaflets to provide what Mr. L. W. Joynson-Hicks, Parliamentary Secretary to the Ministry of Fuel and Power, who opened the exhibition, described as "new recruits to the Charing Cross training school" with plenty of information.

Perhaps the main feature of the exhibition is the attention paid to the question of dealing with smoke pollution in London. Display panels give extracts from the Beaver Report, and maps and photographs show the proposed City of London smokeless zone, smokeless housing estates, and how to prevent industrial smoke. This is the third exhibition of its kind arranged at Charing Cross by the Solid Smokeless Fuels Federation; it will remain open until February 19.

Mr. Joynson-Hicks had a word of praise for the manufacturers of solid-fuel appliances, who had done so much since the end of the war to perfect and produce in increasing numbers new equipment for burning solid fuel smokelessly and efficiently, and was reassuring on the point that this was not the end of the traditional British open fire. The exhibition showed how it could be enjoyed without creating smoke.

Duty-free Entry of Machinery

In a written answer to a Parliamentary question last week, it was announced that the President of the Board of Trade had appointed a Consultative Committee on the Duty-free Entry of Machinery in accordance with the recommendation by the Wilson Smith Committee. The committee consists of six industrialists, three with experience mainly as makers of machinery, and three with experience mainly as users of machinery, a trades union representative, and representatives of the Board of Trade and the Ministry of Supply. The chairman is an Under-Secretary of the Board of Trade, and the Board of Trade and the Ministry of Supply will provide joint secretaries.

The industrial members are Mr. A. P. H. Aitken, managing director of Textile Machinery Makers, Limited, Oldham; Mr. R. W. Asquith, chairman and joint managing director of William Asquith, Limited, drilling machine manufacturers, of Halifax; Mr. M. A. H. Bellhouse, deputy managing director of the Pressed Steel Company, Limited, Cowley, Oxford; Mr. W. Ellison; Sir Laurence Merriam; and Mr. A. Yorke Saville. The trades union representative is Mr. Jack Tanner, former president of the TUC and of the Amalgamated Engineering Union, while the joint secretaries are Mr. D. P. Brearley (Board of Trade), and Mr. D. M. J. Gwinnell (Ministry of Supply).

Centrifugal Casting of Steel*

Historical

For more than a century, metallurgists attempted to cast metals centrifugally, but, until 1920, the experimental stage was never passed; the mechanical problems in the construction of centrifuging equipment and the metallurgical difficulties of refining and centrifugally casting metals have only been solved in practice within the last 30 years.

In France, shortly before the last war, the experience of centrifugally casting iron pipes of great length had already been applied to the centrifugal casting of steel tubes. Success in this field was complete for, in 1940, gun barrels cast by these processes were submitted to firing tests with excellent results. Since the war, the processes of centrifugal casting on a horizontal or vertical axis have been extended to the whole range of steels and ferrous alloys.

Processes of Centrifugal Casting

Centrifugal casting in the most general sense involves the use of centrifugal force to drive the metal against the mould walls and into its cavities under a much greater pressure than that produced by the "head" of metal. There are three main methods of centrifugal casting:—

(*a*) Simple centrifugal casting, in which the axis of rotation (horizontal or vertical) corresponds to the axis of the casting, the inside being formed without the use of cores. This applies to tubes, rings, cylinders, etc.

(*b*) Semi-centrifugal casting. The vertical axis of the part or group of parts remains the axis of rotation but the circular parts are obtained entirely by casting (flywheels, tyres, gear-wheels).

(*c*) Casting under centrifugal pressure. Moulds for parts of any shape whatsoever are arranged regularly about the vertical axis of rotation. The metal is cast via a funnel on this axis and centrifugal force is used to ensure the pressure of liquid. This process is of general application. Here, only simple centrifugal casting is to be considered.

Simple centrifugal casting involves rotating a mould at high speed about its axis, pouring in the steel and utilizing centrifugal force to drive the metal against the mould wall so as to obtain after solidification a hollow casting. The axis of rotation may be horizonal or vertical and is sometimes inclined.

Horizontal Axis.—This method is well suited to the production of long or short tubes of various diameters, the internal shape of which is cylindrical. The equipment consists essentially of a metallic cylindrical rotor resting on four rollers, at least two of which are driven by an electric motor of variable speed. The mould itself is situated within this rotor and may be a cylindrical lining of sand or a metal pipe (chill) depending on the process and the gradients of solidification or cooling desired. The steel, made by normal processes, is cast through a runner which discharges the liquid stream on the axis of rotation at one end of the rotor. For relatively short parts, the mould may be driven directly by the motor.

Vertical Axis—The liquid surface takes up a parabolic form, the position being determined by the mould capacity and its speed of rotation. As the speed of rotation increases, the trough of the parabola descends and the difference in wall thicknesses at the top and bottom of the mould decreases. Centrifugal casting on a vertical axis is primarily employed for parts where the height is small in relation to diameter.

Moulds Employed

The choice of chill or refractory sand moulds depends on the type of work and on the steels or alloys to be cast.

Sand moulds are generally employed for very long tubes and those of variable thickness, for small numbers of parts, or for technical metallurgical reasons (slow cooling after casting). The lining strength must be sufficient to withstand the abrasion and high pressure resulting from the rotation of the mould.

Metal chill casting is well suited for repetition work. However, it produces a very rapid cooling of the tubes and is difficult to employ for long parts where rapid shrinkage may cause hot-cracking and render them unusable even after a preliminary heating of the mould.

This rapid cooling from outside to inside is sometimes necessary to produce a very fine structure. By varying the thickness of a coating layer, the rate of cooling and solidification can be adjusted to the optimum value for a particular alloy.

Characteristics

The properties of centrifugally-cast steel tubes are broadly speaking intermediate between those of cast parts and forged steels. Although less compact than forged steels, centrifugal steel has excellent mechanical properties, a good capacity for deformation and a high impact strength.

As with ordinary cast steel, an appropriate thermal treatment must be given to centrifugally-cast steel to obtain suitable properties. An advantage of this material is its remarkable freedom from coarse grain due to the absence of working and the consequent uniformity of mechanical properties with simple orientation (radial, tangential, or longitudinal).

With relatively slow-cooling, correct degassing is achieved, eliminating blowholes, and the liquid metal is purified because low-density impurities are forced towards the internal surface. For very thick sand-cast tubes, the same mechanism produces a marked segregation of carbon towards the inside.

* Reprinted from the *Revue* of the *Chambre Syndicale de Producteurs d'Aciers fins et speciaux*, and slightly abridged.

This segregation is greater: (*a*) As the liquidus and solidus are farther apart, and (*b*) as diffusion is greater, due to a faster diffusion rate (vibration, effect of centrifugal force) or to a longer time of solidification (sand casting). It can therefore be regulated to some extent by the processes of casting.

Carbon segregates to the greatest extent and this segregation results in inherent internal stresses which produce a natural self bonding in this type of tube. In the case of thin tubes, or for a metal giving solid solutions, a very rapid cooling after casting practically eliminates segregation and the associated internal stresses due to heterogeneity.

Applications

It is possible to centrifuge all steels: carbon steels and alloy, stainless (with 13 per cent. Cr and 18/8), and heat-resistant steels; this process therefore supplements the classical techniques of tube fabrication, particularly in the following instances:—

(*a*) Faster mass-production of tubes,

(*b*) for thick tubes of large transverse or longitudinal dimensions where ordinary casting and rolling would be technically impossible,

(*c*) alloys difficult to process hot, such as certain manganese and silicon steels, and the majority of stainless and heat-resistant steels.

In comparison with ordinary casting, there is a saving in cores for hollow parts and in relation to the operations of forging, tube rolling or boring, there is no cropping or loss of metal due to the shrinkage head of ingots, scale losses during successive reheatings or to stamping, drilling and boring.

Many years industrial experience has confirmed the importance of the process of centrifugal casting in all fields. Special mention should be made of the application of centrifugal casting to dead-mild magnetic steels, alloy steels, abrasion-resistant steels and stainless and heat-resistant steels.

The uses of tubes and hollow parts centrifugally cast from fine or special steels are numerous and relate to all kinds of special tubing such as (*a*) very-high-pressure conduits (*b*) conduits for hydraulic and pneumatic pumping (*c*) pipes for the transportation of all types of abrasive materials (*d*) stainless-alloy tubes for the chemical industry, and (*e*) pipes for high-temperature fluids. They are also applied:

(1) In the mechanical and electrical industries, for linings of pumps for sludge, cements and abrasive or corrosive liquids; linings for the cylinders and pistons of servo motors or hydraulic regulators which are immersed.

(2) In the chemical industries and industrial furnaces for retorts of gaseous cementation furnaces, the collection of furnace gases, hydrogenation catalysers, linings for ammonia-synthesis furnaces, special piping, stainless flanges, heat-resisting steel rollers for annealing furnaces, radiant tubes, etc.

(3) In the automobile and aviation industries for telescopic jack parts, axle journals, locomotive piston shafts, bearings lined with bronze, lead or Babbitt metal, shafts, collars, drums, shock-absorbers for landing-systems, air cylinders, crown-wheel-and-pinion gears, cylinders and firing chambers of combustion engines, various heat-resisting alloy parts for gas-turbines, etc.

(4) In the textile, dyeing, printing, and finishing industries for carding, separating and leaching rolls, rollers for dyeing machines, cylinders for bleaching, printing-press rolls, rolls for finishing mills, smoothing rollers, mercerizing rollers, pressing and engraving cylinders, etc.

Lastly, it is important to mention the possibility of obtaining tubes with composite walls by centrifugal casting, *e.g.*: (1) an outer sheath of a stainless alloy with an iron or steel inner lining, and (2) an outer sheath of carbon steel with the inside of a hard iron resistant to abrasion, or of alloys resistant to corrosion or to simultaneous corrosion and abrasion.

Such tubes find applications in the textile and chemical industries for the transport of abrasive (or abrasive or corrosive) materials.

It should be noted that the centrifugal casting of plain steels, normal and special irons, copper, bronzes and brasses, pure and alloyed lead, etc., makes possible the production of tubular parts of excellent quality which find many varied applications in all branches of industry.

To sum up, whatever the technique employed (centrifugal casting with a horizontal or vertical axis in sand or chill moulds) it is possible to obtain by this process sound parts possessing very satisfactory properties. Certain structural characteristics make centrifugally-cast steel a new material with outstanding advantages for special applications.

Nuclear Engineering Course

Manchester University is to start the first full-time university course in Europe for the training of atomic engineers. It will last six weeks and will be conducted by Prof. J. Diamond, of the Department of Engineering at the university, who was formerly at the Atomic Energy Research Establishment at Harwell.

Most of the students will be drawn from industry. It is hoped that the lectures will be extended next year to undergraduates, who will have the option of taking nuclear engineering as a subject in their final degree examinations.

Coke-ash Impurities in Steel

Spectrographic analyses of some rare elements which may be introduced into pig-iron from fuel ash have recently been carried out in Sweden by Ake Josefson ("Jernkontorets Annaler," December, 1954). Tests were first made on coke-ash, and later on basic-Bessemer steel made from coke pig-iron. The steels were found to hold from 0.0003 to 0.0005 per cent. Ge and about 0.0025 per cent. Ga. The probability of observable differences between coke pig-iron and charcoal pig-iron owing to such elements is discussed by the author and is found to be very low.

Industrial Aspects of Air Pollution

Harrogate Conference Report

A conference on "Industrial Aspects of Air Pollution" organized by the Combustion Engineering Association was held at Harrogate in December.

In an address on "Industry and Air Pollution" Sir Hugh Beaver (chairman, Air Pollution Committee) said the view of the committee was that both directly and indirectly industry itself suffered severely from heavy air pollution. It was, however, another question whether it would pay industry to meet the cost of the cure—if and so far as a cure could be found. To the extent that industry, collectively and still more individually, could see direct benefit there was, of course, no more to be said. Efficient management would do the rest.

There might, in some directions, be at least some possibility of treating smoke and flue gases as a by-product to be turned to some profit or at any rate to serve to produce some contribution to the cost of dealing with it. Obviously there were cases where the producer of pollution himself suffered —from corrosion of plant, from increased cost of maintenance and so on. When one came to means, one was unfortunately faced by the fact that far too little was known about far too much. It was the inescapable fact that with regard to a great deal of gaseous pollution they did not know what to do. There was much that must be done in research, chemical and technical and medical. The speaker said he could not help feeling—and he believed his Committee would probably agree—that so long as it was not really necessary to find an answer, the attitude towards research in this direction would not be urgent. He hoped that the absence of incentive had been removed. He emphasized the need for extensive co-ordinated research, and that any effective fuel policy must obviously include a consistent pricing scheme for all fuels in all forms. He concluded by saying that while they were confident that both domestically and industrially a great deal could without question be effected, it was neither a short nor an easy nor a cheap business. It was, however, perfectly possible to see the objective and to lay down a certain long-term plan.

Problems of Steelworks and Foundries

In a contribution on "Air Pollution in Relation to the Manufacture of Iron and Steel" by Neil H. Turner (United Steel Companies Limited), the author considered the potentialities of atmospheric pollution arising from the sequence of processes involved in manufacture. Progress towards elimination of air pollution had been achieved during the last few decades due to the need for better fuel usage and the stress laid by the upper management on the necessity to make working conditions more pleasant. He showed how, in the case of blast-furnaces operating on low-grade ores, the preparation of the ore had proved a step in the right direction in reducing appreciably the amount of dust released to the atmosphere by furnace slips, and indicated the measures taken to avoid ore preparation itself becoming at times a serious cause of atmospheric pollution. Discussing coke-making, the speaker pointed out that, while the operator could do much to help, some modification to the design of the ancillary plant would be called for if dust emission was to be reduced to a minimum. Mention was made of steps already taken in that direction in the plant belonging to the Appleby-Frodingham Steel Company. He also referred to advantages derived from the lesser use of gas producers for firing open-hearth furnaces. On the other hand there were developments in steelmaking which might give rise to new problems of dust control.

Air pollution in relation to the operation of foundries was discussed by J. G. Watkins, M.A. (Firth Vickers Stainless Steels, Limited), who pointed out that the bulk of foundries were comparatively small and largely engaged in a "jobbing" trade and did not have the advantages of specialized technical knowledge associated with ventilation and collection of dust and fumes. However, foundries did not present any problems not known in other industries, but emphasis was laid on the use of coke for firing mould and core stoves and the difficulties in the maintenance and operation of such stoves. Pollution caused by grit and dust arising from pattern-making, dried-sand handling, and fettling of castings, was considered, figures of particle sizes of dust created by these operations being indicated as from 1 to 200 microns with dust densities from 2 to 10 grains per cub. foot.

The simple dry cyclone was stated to be the most common form of dust collector for such operations, but it was shown that this collector could not efficiently trap all the dust produced in foundry operations. Other methods of dust collection were touched upon but it was concluded that all of these methods meant higher capital expense than for the simple cyclone.

Stating the broad outlines of the problem in relation to the average density of pollution in the atmosphere, the author drew the conclusion that for these foundry operations at least two different methods of dust collection working in tandem were required to have any effect on the present air pollution problem. He concluded that it might not be economically possible for industry in general to adopt such methods and suggested that the domestic field would show a more profitable expenditure of capital in relation to the national problem.

Other papers presented included "Air Pollution in Relation to the Manufacture of Bricks and Pottery," by A. T. Green, D.Sc. (British Ceramic Research Association), and one on the problem of small industry using steam, by Eric Bentley (Albert E. Reed & Company, Limited).

Book Reviews

Pour le Fondeur d'Alliages Legers (for the Light-alloy Founder), by H. le Breton. Published by Dunod, 92 rue Bonaparte, Paris 6; price 360 francs.

This is an excellent practical book for the small and medium-size light-alloy founder. It deals with every aspect of his business in eight chapters. First, the author covers the physical phenomena associated with the cooling of light alloys, and all the trouble that can arise therefrom, right from draws to dissolved gases. Next, he outlines the steps necessary to take to overcome these difficulties, and moreover deals with them in a sensible, workmanlike manner.

In chapter 3, design comes in for consideration, and here the founder is supplied with ammunition, which is fired in Chapter IV. This tells the founder in very blunt terms how to negotiate with clients who submit poor designs. One piece of advice is that when a founder accepts a poor design he should give a price for similar castings of good design and a supplementary price for making a bad one—with no guarantees.

A chapter on moulding—a very long one—and one on melting follow. Both are full of good precepts, which should be better known. The last chapter covers the die-casting of light alloys, and there are in addition a number of useful appendices dealing with pyrometers, care of crucibles, exothermic sleeves, blind and open side-feeders, interesting notes on fettling, and the use of chills. The best testimony to this book is that the reviewer deems it of such a standard that it is well worth being translated into English.

V. C. F.

Chambers of Commerce Manual, 1954-55. Published for the Association of British Chambers of Commerce by United Trade Press Limited, Boswell House, Gough Square, Fleet Street, London, E.C.4; price 50s., post free.

This book is quite different from most of its type. There is—as its opening section—a directory of the Chambers of Commerce, not only in this country, but the British ones established abroad. The next section (and each part is separated from its neighbour by a system of tabs) is captioned "Industrial and Commercial Information." It covers such subjects as finance, taxation, law, local government, banking, labour and employment. The final subdivision is a directory of trade unions. It is a pity that no comparable list of employers' associations is given, apart from the Chambers of Commerce, for in the reviewer's office, at least, dozens of requests are received for information as to the whereabouts or activities of employers' associations for every one related to trade-union activities.

The reviewer is well aware of the length of such a list of employers' organizations, but he still deems it would be a well-worth-while feature.

"Fuel and Power" is the title of Part III and in it is given information on coal, electricity, gas, and fuel efficiency. Many data are given about the nationalized control of fuel and power undertakings. This is followed by "Transport and Communications"—a valuable section covering such matters as the details of the various ports, railways, canals and so forth. The book is completed by parts dealing with overseas and Commonwealth trade. Both are useful, but the latter, in the reviewer's opinion, could well be extended. Finally there is a first-rate index.

Founders, and especially those with modest plants, will find this manual a useful compendium of commercial information. Its annual revision will make it even more valuable, because directory information changes almost daily. For its size—getting on for 700 pages— it is remarkably complete and if at times a source of information is indicated instead of a direct answer to a query, that is a result of the physical limitations of size.

V. C. F.

Kempe's Engineers' Year Book, 1955. Edited by C. E. Prockter, under the direction of B. W. Pendred, and published in two volumes by Morgan Brothers (Publishers) Limited, 28, Essex Street, Strand, London, W.C.2. Price 75s., plus 2s. 6d. postage.

In reviewing the 1954 edition, to which was devoted almost a column of the JOURNAL, it was pointed out how very useful this year book was to foundrymen, as it gave them a source of information on subjects impinging in on their work. The context embraces such matters as air-compressors, cranes, shafting, mechanical handling, gearing, heating, ventilating and air-conditioning, registered designs, trade marks, and legal notes for engineers. It is doubtful if anywhere else all these and analagous subjects could be found authoritatively set out. The sections on foundry practice are excellent, and, here, the information on shell-moulding has been brought up-to-date. The year-book can be unreservedly recommended to readers as being a thoroughly reliable work of reference.

V. C. F.

New Catalogues

Sand-testing Equipment. Exquisite photography has been used in the preparation of a catalogue from George Fischer of Schaffhausen, through their British agents, Foundry Suppliers, Limited, of 25A, Cockspur Street, London, S.W.1. This 20-page brochure illustrates and describes a very wide range of sand-testing apparatus, starting with a gadget for taking representative samples and canisters for transferring the samples to the laboratory and for their storage. Then there is shown a mix/muller, apparatus for preparing the various types of test-piece and the examination of the latter, including a neat infra-red lamp for the moisture testing of a sample resting on a balance pan. The brochure satisfies every requirement to be expected from modern industrial literature. It is available to readers on writing to Cockspur Street.

Pig-iron and Raw Materials. It seems a long time since a catalogue covering pig-iron and the like has been issued. A very attractive one has just been published by Leigh and Sillavan, Limited, of Arkwright House, Manchester, 3. It is pleasing to note that the system of selling to analysis is carried out and some of the best-known brands are handled. As the issuing house does not in every case act as sole agent, a wise system is used of printing a little map to indicate the area served.

The brochure which is spirally bound is well illustrated, and covers, in addition to pig iron, exothermic alloys, wire products, tubes and steel sections and similar material. The brochure is available to our readers on writing to Arkwright House.

Industrial Gloves and Protective Clothing. A catalogue, running to 22 pages, received from G. Waddington & Son, Limited, Newland, Hull, stresses the notion of "a glove for the job," and three sections are devoted to the requirements of the "heavy," "medium" and "light" industries. Another section covers aprons, sleeves and leggings, whilst in the final part items made to British standard specification are described and illustrated. The catalogue is available to readers on writing to Hull.

New Equipment

Swarf Separator

Type JYP (Fig. 1) non-electric swarf separator, manufactured by Rapid Magnetic Machines, Limited, Lombard Street, Birmingham, 12, is a motorized, self-contained machine with push-button control. It incorporates features of design which it is claimed provide uniform feed, correct presentation of the material to the magnet, agitation of collected iron for freeing non-ferrous material, and automatic discharge of extracted iron. The magnet unit is of the high-intensity pattern incorporating "Alcomax," two magnets having high available energy, high coercive force, and an exceptional degree of magnetic stability. This unit, being of the "permanent" type is unaffected by power cuts or failure, requires no electrical wiring and maintenance, and running costs are eliminated. The equipment includes a large-capacity built-in hopper with a feed regulator, a jig shaker feeder, diverting chute and totally enclosed roller-chain drive. The range of sizes available will deal with from 20 to 80 cwt. per 9-hr. day.

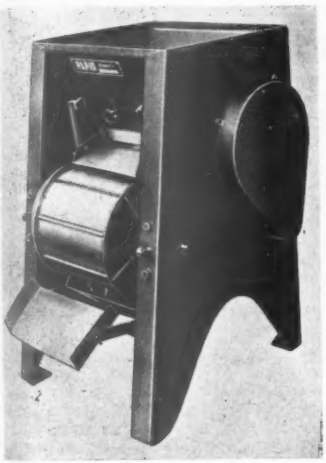


FIG. 1 (*left*). — "*Rapid*" *model JYP swarf separator.*

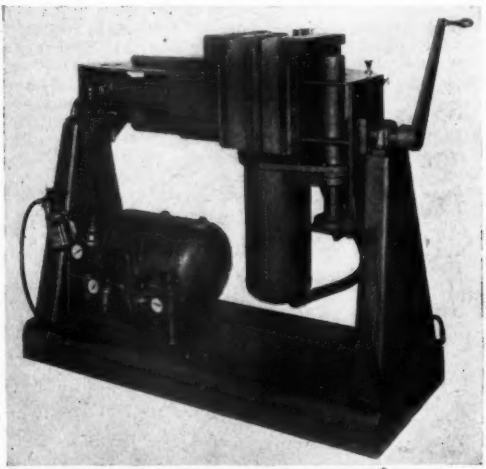


FIG. 3 (*right*). — "*Shalco*" *shell coreblower model CM-5, to accommodate coreboxes up to 9 by 12 by 20 in.*

Investril Wax Injector

The Investril wax injector for precision investment casting, manufactured by W. J. Hooker, Limited, 4, Midland Crescent, Finchley Road, London, N.W.3, is of one gallon capacity and maintains the wax at an accurate and steady temperature. The unit is thermostatically controlled and has a large red "tell-tale" light to indicate when it is operating. It is designed to take 10 lb. per sq. in. pressure which gives excellent wax impressions when using rubber moulds. Injection is from the bottom of the container which prevents the machine being spoiled by the wax as can occur with side and top injection. The accompanying illustration (Fig. 2) shows a number of injectors being tested before despatch.

FIG. 2.—*Group of Investril wax injectors.*

Shell Coreblower

Unlike a gravity-type shell-coremaking machine previously made by the Shalway International Corporation, 1450 University Avenue, Palo Alto, California, USA, a new machine (Fig. 3) can use either gravity-type investment or standard coreblowing techniques. It is similar in operation to conventional coreblowers, except that the corebox is heated, and phenolic resin is used instead of conventional corebinders. The machine is designed for use with orthodox coreboxes.

It is claimed that completely-cured shells, ready for setting in the mould, are produced at a rate of one every 30-50 sec., depending upon the wall-thickness desired. With multiple-cavity coreboxes, the production rate is proportionately higher. Inasmuch as the core is completely cured in the heated corebox, most subsequent handling operations as well as drier plates and core ovens are completely eliminated.

New Equipment

The new machine, model MC-5, is designed to accommodate coreboxes of all sizes up to 9 in. by 12 in. in width and up to 20 in. long. By the addition of longer heater plates, cores up to 30 in. long can be produced. Standard wiring is for 220 or 440 v. 3-phase electrical supply. Heater-plate temperature is thermostatically controlled to assure consistent, uniform core production. The air pressure required is 90 lb. per sq in.

Electrically-heated Bell-furnace

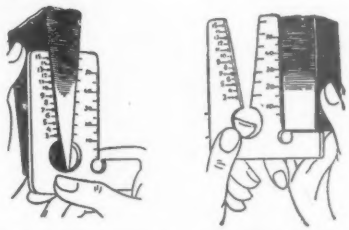
At the works of Shepcote Lane Rolling Mills, Limited, Sheffield, a subsidiary of Firth-Vickers Stainless Steels, Limited, one of the processes carried out involves the batch softening of coiled stainless-steel strip of 17 per cent. chrome quality at between 780 and 800 deg. C. The coils are heat-treated after they have been hot rolled and welded together to form a coil of up to 10,000 lb. in weight. Hot rolling reduces the strip to about 0.125 in. thick, and after softening, it is cold rolled down to the particular gauge required. Among new plant installed is an electrically heated bell furnace, supplied by G.W.B. Furnaces, Limited, of Dudley. This furnace, of the lift-off type, was supplied complete with two charge bases, a slow-cooling hood, and all automatic temperature control equipment, switchgear and an oil circuit breaker. The heating bell (Fig. 4) is rated at 220 kw contained in a single automatically controlled zone. The normal process cycle covers a total of 14 hrs., which includes a soaking period of from 2 to 4 hrs., these being average figures—in practice a temperature of 750 deg. C. is usually reached within 6 hrs. Each base carries two coils of stainless-steel strip with a total maximum weight of approximately 20,000 lb., the coils being 4 ft. dia., and 1 m. wide. The coils are loaded individually by means of the shop crane, and are carried on cast heat-resisting steel jigs with radial supports underneath and a central column running through the middle of the coil with an attachment at the top for lifting purposes. The whole charge weight is taken on a cast heat-resisting steel stool fixed into the hearth brickwork. Each base is fitted with an air-circulating fan which draws air through the centre of the coils, and blows it up around and over the heating elements situated around the wall of the furnace.

When the soaking period is completed, the heating bell is lifted off and replaced by an open-topped sheet steel cover intended to prevent direct radiation from the hot charge on to workmen in the surrounding area. The relationship between the heating and cooling cycles ensures continuous working of the furnace in conjunction with the two bases.

Instrumentation includes an indicating controller of Kent manufacture, and a Kent three-point recording instrument giving a positive check of thermal conditions on either base and on the heating bell itself.

FIG. 4.—*GWB two-base bell furnace; (left) steel cover; (right) furnace.*

Chill-test Gauge



The illustration above shows a gauge, developed by the *Centre Technique des Industries de la Fonderie* for the measurement of chill on either rectangular or wedge-shaped chill test-pieces.

Automatic Water Spray for Belt Conveyors

Automatic control of the water delivered by sprays at conveyor transfer and loading points is achieved by a device designed by Mr. D. Green, assistant enginewright at Cotes Park Colliery, Derbyshire. It is undesirable that water should continue to flow when the conveyor is stopped or is running empty, but it is important that the spray should operate when material is being conveyed.

Mr. Green's device automatically turns the spray on only when the belt is running and carrying material. A plunger-type valve, originally designed to control tub sprays, is fitted in an inverted position and held by side plates. A lever, fitted with a cam which is in direct contact with the valve plunger, is mounted on the side plates with the fulcrum at the top.

The attachment is fixed to the roof of the roadway and slightly in front of the conveyor's delivery roller. It is so positioned that the lever is vertically in line with the centre of the conveyor, with its lower end in the direct line of the flow of material. As the material falls from the conveyor, it deflects the lever from the perpendicular position; this operates the cam which opens the plunger valve.

If the device is correctly mounted it will turn on the water even if there is only a thin trickle of gummings falling from the conveyor, but despite this fine control, the water is turned off completely when the belt is empty. If the conveyor is heavily loaded, the lever is pushed out of the way and the valve remains open.

Parliamentary

Co-partnership in Industry

Urging the Government to equip itself with comprehensive information about co-partnership schemes in industry, Mr. Raymond Gower (Con.) said in the House of Commons that he did not ask for legislative compulsion because the success and durability of such schemes depended on agreement between all concerned, but he wanted the Government to remove many of the difficulties now being experienced over taxation, registration, and Board of Trade requirements.

Seconding the motion, Mr. Leather (Con.) said that in the biggest and most successful industrial firms pension schemes, works councils, and profit sharing were almost universal. But there were many smaller firms where management was mediocre, lethargic, and indifferent. He wished the President of the Board of Trade would scold the employers who were guilty of doing something crass or who deliberately provoked industrial trouble.

Mr. Norman Smith (Lab.) said that in the context of Britain's present economy all schemes of co-partnership and profit sharing were a trifle. To achieve sensible co-partnership and to give workers a direct incentive in seeing that plant was brought up to date, there should be legislation to provide that when bonus shares were issued they should be divided equally between the absentee owners and the employees.

In the view of Capt. Christopher Soames (Con.) there should be no compulsion from Parliament. It should become the general custom when a man applied for a job, he said, that he automatically asked, "What is the wage, and what are the principles of co-partnership practised in this firm?" Then all firms would realize that unless they practised some form of co-partnership they would not get the high standard of labour and production that they would like to have.

If the motion were accepted by the Government, said Mr. Bottomley (Lab.), is might be taken to the National Joint Production Council, on which sat not only the trade union representatives but employers and other persons interested in the country's economy.

Mr. Harold Watkinson, Parliamentary Secretary to the Ministry of Labour, said that the broad issues under discussion affected the 23,000,000 people in the working population. The Government's duty was to give a lead to practical action to encourage better relationships and teamwork, and they would try to give a lead wherever possible, but they did not believe in legislation or in too much exhortation and recrimination.

The Government accepted the motion subject to the qualification that it was not their task to force any scheme on industry. They would do what they could to encourage schemes, and the Ministry of Labour was already helping in various ways. Two expert committees had been set up to carry out research over the general field of incentive payment schemes. Work on pensions was being done through the advisory committee dealing with the employment of older people. He would see whether it was possible for the Ministry to resume publication of information on the subject. The Financial Secretary to the Treasury and he also agreed to see what could be done to clear away any improper or unnecessary difficulties which people came up against who wanted to introduce a co-partnership or pension scheme.

The motion was agreed to.

Research Associations

Answering Mr. Willey, who asked the Parliamentary Secretary to the Ministry of Works, as representing the Lord President of the Council, what steps had been taken to carry out surveys of resources, facilities, and programmes of the research associations in relation to the scientific, technological, and economic needs of their industries, Mr. Bevins said that special surveys covering three research associations—leather, cast iron, and ceramics—were carried out, as an experiment, in 1950-51. Details of the surveys, which were of considerable value, were given in the report of the Department of Scientific and Industrial Research for 1951-52. A survey of the British Scientific Instrument Research Association's work was under way.

Mr. Willey, who then asked what grants for capital expenditure had been made to research associations in each of the past five years, and subject to what conditions had the grants been made, was told that in the financial year 1950-51 payments of £271,000 were made; in 1951-52 £53,000; in 1952-53 £17,000; and in 1953-54 £2,000. Mr. Bevins said it was not expected to make any capital payments in this financial year. Industries were asked to undertake to raise special contributions over and above their normal revenue

Commercial Supplies of Pure Metals

The Parliamentary Secretary to the Ministry of Works, as representing the Lord President of the Council, was asked by Mr. Skeffington what research had been undertaken by the Department of Scientific and Industrial Research into the preparation of pure metals on a commercial basis.

Replying, Mr. Bevins said that iron, gallium, and germanium had been prepared on a small scale in a high state of purity in the DSIR laboratories. Research was now in progress both on the preparation of pure chromium, indium, antimony, and the rare earth metals, and on the further purification of iron and gallium. The results were available to industry.

When Mr. Skeffington asked what resources of staff and finance were being devoted to increasing the nation's supply of germanium, Mr. Bevins said he could not say precisely what was the total of resources and staff at present engaged.

DOMESTIC consumption of solid smokeless fuel had increased by nearly 10 per cent. in the past 12 months, said the Parliamentary Secretary, Ministry of Fuel and Power, in a written answer.

ASKED by Mr. Shepherd whether he had any statement to make about the completed report of the Monopolies and Restrictive Practices Commission on the supply and export of semi-manufactures of copper and copper-based alloys, the President of the Board of Trade said that he received the report on January 22. When it had been printed, it would be be laid before Parliament in accordance with the provisions of Section 9 of the Monopolies and Restrictive Practices (Inquiry and Control) Act, 1948.

ARMSTRONG WHITWORTH AIRCRAFT, LIMITED, announced on January 29 that it has acquired a centre in Birmingham where guided missiles will be designed and developed on the drawing board. A spokesman of the company stated that the premises would be brought into use in "the very near future." Work done would supplement that carried out at the company's main missile works. The acute shortage of draughtsmen in the industry has led the company to set up the design office in Birmingham where it is thought there is more chance of attracting suitable staff.

Company News

WHESSOE, LIMITED—A two-for-three scrip issue to holders at February 12 is proposed, which will raise the issued ordinary capital to £1,000,000.

LE GRAND, SUTCLIFF & GELL, LIMITED, well drillers, pumpmakers, founders, of Southall (Middx)—A final dividend of 7½ per cent. is recommended, making 12½ per cent. for the year ended September 30 last, against 10 per cent. for 1952-53.

WOLVERHAMPTON METAL COMPANY, LIMITED—Subject to consent of the Capital Issues Committee, it is proposed to make a scrip issue of 788,000 ordinary 5s. stock units in the proportion of one stock unit for every two ordinary units held.

GENERAL ELECTRIC COMPANY, LIMITED—While the board announces an increase in the interim dividend from 3¾ per cent. to 4½ per cent. on the £11,755,440 ordinary capital, no change in the 12½ per cent. annual total is expected. The directors state that they expect to be able to recommend a final distribution of 8 per cent. for the year to March 31 next, against the 8¾ per cent. final paid for 1953-54.

SHANKS & COMPANY, LIMITED, sanitary engineers and ironfounders, of Barrhead, near Glasgow—Untaxed profits have increased by £137,899 to £296,456 and the board recommends a final dividend for 1954 of 10 per cent., less tax, on doubled ordinary capital of £725,000. An interim of 5 per cent. was paid on capital before the 100 per cent. scrip issue of last September. The 1953 final of 12½ per cent. made 17½ per cent.

JOHN BROWN & COMPANY, LIMITED—The company is to pay an interim dividend on ordinary stock of 3d., free of tax, per £1 unit for the year ending March 31, 1955. For the past few years the interim has been 4d. net per unit. The comparable payment on the bonus-increased ordinary would be 2¾d. per unit. The present interim is not to be taken as indicative that the total dividend amount for the current year will be greater than for last year.

MILLSPAUGH, LIMITED, manufacturers of paper-making machinery, etc., of Sheffield—The company is again cutting its ordinary distribution. A final dividend of 7½ per cent. now recommended makes a total of 12½ per cent. for the year ended September 30 last on the existing equity of £630,957. Previously, a 10 per cent. final was paid on similar capital, following a 6 per cent. interim on the £360,547 equity prior to a three-for-four rights issue.

BROOM & WADE, LIMITED, manufacturers of air compressors, etc., of High Wycombe (Bucks)—Turnover was not so high in the year to September 30 last as in the previous 12 months, states Mr. H. S. Broom, chairman, in his review with the report. Stockholders are informed, however, that the sales trend moved upwards during the second half of the year and the order-book at present is satisfactory, despite keener competition with customers more price-conscious. Group profits, before tax, of £523,744 compared with £516,846.

FORD MOTOR COMPANY, LIMITED—The directors propose a one-for-one scrip issue capitalizing £19,512,124 of reserves. Application is being made to the Capital Issues Committee. The issue, they emphasize, contains no bonus element. It merely serves to bring the issued capital more into line with the capital employed in the business and it carries no implication as to the future rate of dividend. The new shares will not rank for the final dividend to be paid in respect of 1954. Provided the necessary sanction is obtained, resolutions to effect the scrip issue will be put to stockholders at the next annual meeting.

R. A. LISTER & COMPANY, LIMITED, agricultural, electrical, and general engineers, and ironfounders, of Dursley (Glos)—Record turnover and profits, before taxation, were achieved in the year to September 30, 1954. Widespread export connections and goodwill produced record demands for the products of the group during the year. This trend, says the chairman, Sir Percy Lister, currently continues. An improvement in trading conditions in Australia has reflected itself in the more recent returns of the company's Australian subsidiary, and, says Sir Percy, this improvement should be maintained.

Contracts Open

The dates given are the latest on which tenders will be accepted. The addresses are those from which forms of tender may be obtained. Details of tenders with the reference ESB can be obtained from the Board of Trade, Export Services Branch, Lacon House, Theobalds Road, London, W.C.1 (telephone CHAncery 4411, ext. 738 or 771), unless otherwise stated.

BRIERLEY HILL (STAFFS), February 18—Cast-iron manhole covers and gully grates, for the year ending March 31, 1956, for the Urban District Council. The Engineer and Surveyor, Civil Buildings, Brierley Hill.

DUNDEE, February 15—Manganese cast-steel dock-type railway switches and crossings, for Dundee Harbour Trust. Mr. A. Smith, General Manager and Engineer, Dundee Harbour Trust, Harbour Chambers, Dock Street, Dundee.

HEMEL HEMPSTEAD (HERTS), February 18—Heavy castings, manhole covers, gullies, etc.; light castings, hydrant covers, valve covers, etc.; cast-iron pipes and specials; and wrought iron and steel tubes and fittings, for the fiscal year 1955/56, for the Borough Council. Mr. A. H. Turner, Borough Engineer, Market Square, Hemel Hempstead.

IPSWICH, February 14—Cast-iron manhole covers and gully grates, for the 12 months commencing April 1, 1955, for the Borough Council. The Borough Engineer and Surveyor, 11, Tower Street, Ipswich.

POOLE, February 15—Iron castings, manhole covers, etc., for the 12 months ending March 31, 1956, for the Borough Council, Mr. J. R. Barron, Borough Engineer and Surveyor, Municipal Buildings, Poole.

SOUTH AFRICA, February 16—50-ton zinc ingot, of 99.8 per cent. minimum purity, for the Stores Department of the South African Railways. (ESB/1699/55.)

SOUTH AFRICA, February 17—Stranded copper catenary wire, for the Stores Department of the South African Railways. (ESB/1919/55.)

TYNEMOUTH, February 21—Cast-iron work for the year ending March 31, 1956, for the Borough Council. Mr. D. M. O'Herlihy, Borough Surveyor, 16, Northumberland Square, North Shields.

SOUTH AFRICA, February 17—Foundry mixing ladles, for the Stores Department of the South African Railways. (ESB/1374/55.)

Changes of Name

Among the companies which have recently changed their names are those listed below. The new titles are given in parentheses.

GREYFRIARS PATTERN MAKING COMPANY, LIMITED, 87, Foleshill Road, Coventry (Stokes Patterns, Limited).

MECHANICAL PROTOTYPES, LIMITED, 8/11, North Audley Street, London, W.1 (Wharton Engineers (Elstree), Limited).

DRON & DICKSON AGENCIES, LIMITED, engineers, etc., of 30, Lloyd Street, Manchester (Dron & Dickson, Limited).

"WILSON'S" FORGE (1929), LIMITED, South Church Road, Bishop Auckland, Co. Durham (Wilson's Forge, Limited).

R. C. A. ENGINEERING, LIMITED, 44a, Gloucester Road, Croydon, Surrey (Arnold & Samson Engineering, Limited).

JOHN H. PYE, LIMITED, manufacturers of metal windows, etc., of Derry Street, Wolverhampton (Kieft Oil Products, Limited).

MARKMASTER (OVERSEAS), LIMITED, machinery dealers, etc., of 39, Victoria Street, London, S.W.1. (Markmaster (Trading), Limited).

C.W.D. PRESS TOOLS, LIMITED, Street Sidings, Mill End, Kenilworth, Warwickshire (C.W.D. Tools & Equipment, Limited).

OZALID (NORTHERN SALES), LIMITED, manufacturers of mechanical instruments, etc., of 62, London Wall, London, E.C.2 (Ozalid (India), Limited).

Imports and Exports of Iron and Steel in December

The following tables, based on Board of Trade returns, give figures of imports and exports of iron and steel in December. Totals for 1954 and for the previous year are also included.

Total Imports of Iron and Steel

Destination.	Month ended December 31.	Year ended December 31.	
	1954.	1953.	1954.
	Tons.	Tons.	Tons.
Channel Islands	539	3,950	5,171
Cyprus	437	7,576	7,013
Sierra Leone	727	7,203	9,921
Gold Coast	1,650	31,211	31,964
Nigeria	5,757	47,524	58,806
Union of South Africa	5,768	85,239	54,522
Northern Rhodesia	361	13,231	4,545
Southern Rhodesia	7,317	59,455	54,377
Tanganyika	250	13,038	19,498
Kenya	3,885	71,601	66,301
Uganda	162	8,054	5,818
Mauritius	87	7,290	4,668
Bahrein, Qatar, and Trucial Oman	1,467	19,602	19,547
Kuwait	497	13,325	5,595
India	9,536	60,872	93,848
Pakistan	7,625	28,989	67,551
Singapore	1,971	23,689	25,988
Malaya	1,113	29,507	20,947
Ceylon	1,780	19,576	19,372
British North Borneo	441	5,650	3,879
Hongkong	2,550	24,889	28,016
Australia	40,901	125,225	331,730
New Zealand	13,661	112,168	198,902
Canada	7,850	193,109	157,837
Jamaica	991	11,061	14,651
Trinidad	3,695	35,707	38,929
British Guiana	372	4,300	4,669
Anglo-Egyptian Sudan	1,607	22,079	30,310
Other Commonwealth countries	4,357	47,580	38,297
Eire	4,235	40,305	50,354
Soviet Union	—	1,008	—
Finland	8,064	28,013	73,756
Sweden	12,294	84,137	81,922
Norway	8,454	79,243	80,553
Denmark	8,359	98,257	82,622
Western Germany	3,542	5,175	21,352
Netherlands	12,009	124,357	100,503
Belgium	2,157	17,964	12,679
France	195	10,676	4,464
Switzerland	1,305	11,362	11,541
Portugal	1,111	15,720	12,039
Spain	332	4,621	7,120
Italy	1,128	64,296	38,218
Austria	514	1,379	2,170
Yugoslavia	567	7,917	14,050
Turkey	800	13,549	8,884
Netherlands Antilles	518	8,438	3,560
Portuguese E. Africa	231	2,270	2,453
Lebanon	94	3,178	2,059
Israel	491	8,736	7,130
Egypt	2,476	24,996	24,058
Saudi Arabia	103	2,722	4,741
Iraq	1,509	61,876	24,463
Iran	3,440	3,037	12,881
Burma	1,755	13,115	11,994
Thailand	252	9,499	7,806
Indonesia	398	14,077	5,302
Philippine Republic	77	3,673	3,393
USA	5,945	80,546	44,396
Colombia	553	10,814	8,474
Venezuela	5,763	41,745	34,403
Ecuador	418	2,319	2,912
Peru	289	8,364	5,063
Chile	257	1,933	1,497
Brazil	405	1,699	1,446
Uruguay	1,572	6,139	14,261
Argentina	2,550	13,410	55,983
Other foreign countries	4,920	49,095	61,980
TOTAL	226,436	2,112,360	2,355,160

THE FIRST international congress on "Documentation of applied chemistry" will be held in London from November 23 to 25, 1955. Details may be obtained from the honorary secretary of the congress at 56, Victoria Street, London, S.W.1.

Total Imports of Iron and Steel

From	Month ended December 31.	Year ended December 31.	
	1954.	1953.	1954.
	Tons.	Tons.	Tons.
Canada	3,660	67,799	13,623
Other Commonwealth countries and Eire	249	180,892	27,124
Sweden	2,294	31,742	34,804
Norway	6,933	54,845	37,152
Western Germany	845	34,669	42,766
Netherlands	4,488	96,447	90,779
Belgium	6,653	196,997	43,570
Luxembourg	2,794	100,603	18,965
France	8,226	236,451	65,971
Italy	44	36,759	7,527
Austria	8,918	444,607	161,906
Japan	11	56,636	495
USA	11,606	121,089	93,520
Other foreign countries	9,729	41,813	126,050
TOTAL	66,450	1,701,349	764,252
Iron and steel scrap and waste, fit only for the recovery of metal	46,452	861,028	760,478

Exports of Iron and Steel, by Product

Product.	Month ended December 31.	Year ended December 31.	
	1954.	1953.	1954.
	Tons.	Tons.	Tons.
Pig-iron	10,251	6,385	43,751
Ferro-tungsten	7	133	398
Other ferro-alloys	941	2,651	10,698
Ingots, blooms, billets, slabs, sheet and tinplate bars	935	1,913	2,906
Iron bars, rods, angles, shapes, and sections	150	2,000	2,624
Steel bars, rods, angles, sections, and shapes	41,052	264,356	373,288
Iron plates and sheets	10	436	246
Universal plates	27	8,181	4,328
Steel plates, ⅛ in. and under ¼ in.	1,209	8,541	14,981
Do., ¼ in. and over	25,940	209,351	174,970
Black sheets and black plate	17,488	198,624	192,507
Hoop and strip	10,446	94,837	105,838
Tinplate	20,648	259,008	297,525
Tinned sheets, terneplate, and ternesheets	216	1,736	2,357
Decorated tinplate	248	1,259	2,918
Galvanized sheets	12,308	130,968	168,559
Other coated plates and sheets	893	9,799	7,849
Railway and tramway construction material	18,606	237,874	231,161
Wire rods	2,247	21,671	27,826
Wire	8,470	43,790	91,119
Tubes, pipes, and fittings	53,648	590,106	581,379
Iron castings	124	8,883	11,509
Steel castings	138	2,553	1,779
Forgings	434	5,305	4,644
TOTAL	226,436	2,112,360	2,355,160

W. J. HOOKER, LIMITED, 4, Midland Crescent, Finchley Road, London, N.W.3, announce that in future "Die Slick," a die-casting lubricant, will be known as "Sterling" Die Slick, and that a new brand designed for use with plungers, slides and cores, to be known as Plunger Slick, is to be placed on the market.

News in Brief

JANUARY 31 marked the 150th anniversary of the opening of the London Docks, which are now part of the London and St. Katharine Docks.

A CARGO of 9,044 tons of scrap metal—believed to be the biggest of its type to be brought into the Wear—arrived at Sunderland in the Liberian vessel Centaur.

THE RENEWAL of the grant of £2,750 to the Scottish Council (Development and Industry) has been agreed to by the General Finance Committee of Glasgow Corporation.

AN ORDER for 48 Arab double-deck and underfloor-engined chassis has been received by Guy Motors, Limited, of Wolverhampton, from the African Transport Company, Limited.

VIENNA INTERNATIONAL SPRING TRADE FAIR will take place from March 13 to 20. Details are available from the British-Austrian Chamber of Commerce, Incorported, 29, Dorset Square, London, N.W.1.

ACCORDING to a Stockholm report, October was the first month last year when Sweden's iron-ore exports were larger than in the same month of 1953. Exports totalled 1,240,000 metric tons, compared with 1,220,000 tons.

IN 1954, the first complete year that full values have been computed, Newfoundland's mineral production was valued at $44,868,679. Of this figure, iron ore was valued at about $22,959,900, zinc at $7,211,760, and lead at $4,996,827.

GOLD-WATCH presentations were made on Friday, January 28, to a further 14 Wellworthy, Limited, employees who have completed 25 years' service. The total number of presentations now made since April, 1952, is 103.

POPLAR TECHNICAL COLLEGE, in east London, is celebrating the jubilee of its occupation of the present premises in 1905 and the founding of the College the year before by the London County Council as the LCC School of Marine Engineering.

AS PART of the hydro-electric development of the River Conon Valley, a dam at Loch Fannich (Rossshire) is to be built by John Laing & Son, Limited, London, N.W.7, under contract to the North of Scotland Hydro-electric Board.

IN MEMORY of the late Sir Wallace Akers, FRS, who was research director of Imperial Chemical Industries, Limited, until 1953, the company is to rename its Butterwick Research Laboratories at Welwyn (Herts) the Akers Research Laboratories.

THE REPLACEMENT of half the original battery of rich gas-fired Wilputte ovens by 20 modern compound underjet Wilputte ovens at the Fell Coke Works of the Consett Iron Company, Limited, is to be undertaken by Gibbons Bros., Limited, Dudley (Worcs).

EXTENSIONS to the Swansea Works, Toronto, of the Steel Company of Canada, Limited, will cover 66,500 sq. ft., housing nine automatic bolt-making machines, new heat-treating facilities, automatic packing equipment, and modern handling and shipping facilities.

AN ORDER worth approximately $500.000 has been secured by the Stanton Ironworks Company, Limited, for nearly 4.000 tons of spun-iron pipes for the Government of Korea as part of the American Aid programme. The order is to be completed next month.

THE FIFTH Plenary World Power Conference is to be held at Vienna from June 17 to 23, 1956. Communications intended for the British Papers Committee should be sent to the Secretary, British National Committee, World Power Conference, 201-2, Grand Buildings, Trafalgar Square, London, W.C.2.

TWO NEW FIRE-FIGHTING appliances to be featured by the Pyrene Company at the Factory Equipment Exhibition (stand G.16), are a CO_2 pressure-operated dry-chemical extinguisher and a high-expansion foam-making branchpipe. Both are claimed to be especially effective against fires involving inflammable liquids.

BRITISH INSULATED CALLENDER'S CABLES, LIMITED, announce that the new address of their London branch sales office is 10/14, White Lion Street, London, N.1. The telephone numbers are TERminus 8696 and 0372. It should be noted that the company's central administrative offices remain at 21, Bloomsbury Street, London, W.C.1.

SINCE THE SCHEME to present gold watches to long-serving employees of the Chesterfield Tube Company, Limited, was started five years ago, 400 people have received gifts for service totalling over 10.000 years, it was stated when 15 men and one woman, each of whom have completed 25 years with the company, received presentations last week.

ALUMINIUM UNION LIMITED, announce that branch sales offices have been opened at Gazette Buildings, Corporation Street, Birmingham (telephone: CENtral 1446) and at National House, 36, St. Ann Street, Manchester (telephone: Blackfriars 9772/3). The Birmingham office is in charge of Mr. W. J. Cadd and the Manchester office in charge of Mr. A. W. K. Lees.

THE IDEA is being considered of using a liner, moored in the Humber off Immingham, to serve as a floating hotel for delegates to the annual conference of the Iron and Steel Institute, to be held at Scunthorpe this year for the first time. Between 400 and 500 visitors from home and abroad are expected in October and Scunthorpe's limited hotel accommodation cannot deal with the influx.

ULTIMATELY, the Imperial College of Science and Technology aims to provide for about 1,500 undergraduates and a similar number of post-graduate students, says the report of the governing body for 1953-54. Envisaging a much greater rate of increase in the engineering faculty, the expansion is estimated at an increase of 160 per cent. in post-graduate students and 44 per cent in undergraduates.

UNDER A CONTRACT from the US General Services Administration the Metropolitan-Cammell Carriage & Wagon Company, Limited, Birmingham, will supply 1,500 covered goods wagons for 1-metre gauge and 500 broad-gauge open wagons for the Indian Government. The order is worth nearly $3,000,000. The company has also secured an order for 150 open wagons for the Burma Railways worth nearly £150,000.

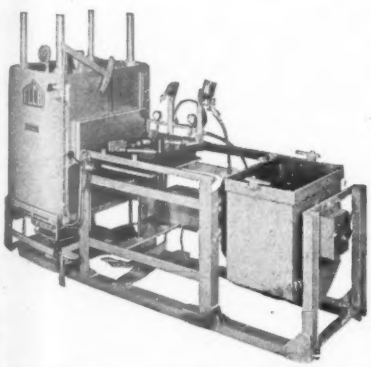
DENMARK has relaxed or removed export restrictions on a number of items. Items on which restrictions have been eased include several types of machinery, electrical equipment, chemicals, metals and minerals, oil products, rubber, and rubber products. At the same time, the Danish Government has cancelled a ruling that free exports to countries belonging to the European Payments Union of goods supervised by the Ministry of Commerce must be paid for under mutual payments agreements or in dollars.

Sir JOHN CRAIG, chairman of Colvilles, Limited, considers that the purchase of shares in the company by employees, while relatively small, indicates a determina-

(*Continued on page* 162)

SHELL MOULDING AT LOW COST

The Shelmolda 'Duplus' is low in first cost, economical to operate and costs little to maintain. Its design is simple and straightforward, yet it has the advantages of more complicated and costly apparatus. Operation is semi-automatic, with all the strenuous work carried out mechanically. The patent oven is thermostatically controlled and gives the machine a proved capacity of 50/60 moulds per hour. Pattern plates measure 24in. by 16in. and the maximum depth of pattern is 5in. Floor space required is 8ft. 6in. by 3ft. 3in. and the machine is operated by one man. Delivery is 8 to 10 weeks.



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News in Brief

(*Continued from page* 160)

tion to make the future of the company a personal responsibility which "surely makes for success." He expresses these views in a message to the workers. After referring to the £20,000,000 expansion scheme at Motherwell, Sir John states that "another great event is the sale to the public by the Government of shares of the company."

LAYCOCK ENGINEERING, LIMITED, Archer Road, Sheffield, has started work on a £500,000 extension scheme. It is expected to take nine months to complete, and includes new machine shops and plant which will be housed in a two-storey building on the Millhouses site. The scheme is part of a £2,500,000 programme planned by Birfield Industries, Limited, of which Laycock's is a subsidiary. The majority of the £2,500,000 for the complete Birfield programme is coming from £1 5 per cent. preference shares offered to shareholders.

AS A RESULT of a suggestion by the Bilston Historical Society, a memorial to John Wilkinson, "father of the South Staffordshire iron trade," is to be erected in Bilston at the Great Bridge Road playing fields. Students of Bilston Art School are to design the memorial which will be carried out in the appropriate medium—iron. A picture of John Wilkinson hangs in Bilston Art Gallery but this has hitherto been the only indication that the famous ironmaster worked at Bradley, near Bilston, at the end of the 18th century and that he built the first iron boat there.

MANY MIDLAND FIRMS are expected to be represented at a lecture in Birmingham to-day, organized by the Midland Section of the Institute of Marine Engineers and being given by Dr. H. S. Arms, an atomic scientist of authority, on the design and operation of nuclear power stations. The British engineering industry sees in atomic energy a new field to be opened up. Because of the importance of the subject and its topicality to industry ,the Institute issued a general invitation to engineers and industrialists. The chairman of the section is Mr. H. E. Upton.

A MEETING, arranged by the Birmingham Productivity Association in conjunction with the Institution of Production Engineers, the Institute of Industrial Administration and the Institute of Cost and Works Accountants, will be held in Birmingham on February 22 to consider the Industrial Engineering Report issued last autumn by the British Productivity Council. Mr. Harold Burke, Midland Region chairman of the Institution of Production Engineers, will act as chairman of the meeting and it is hoped that three members of the team which drew up the report, representing management, the trade unions and industrial education, will be among the speakers.

LOCAL AUTHORITIES must not skim the cream of light industry and expect it to survive without its associated heavy industry, said Mr. E. Holden, secretary of the Midlands branch of the National Union of Manufacturers, on January 27, when he spoke at the annual meeting in Wolverhampton of the West Midland Industrial Development Association. "I am afraid these local authorities are becoming lotus eaters rather than realists." he said. Light industries cannot survive away from the basic industries such as foundries, Mr. Holden said, and this was especially true of engineering. Midlands manufacturers were concerned about the life of their factories, he went on. Some had less than five years and this was no position for industry to be in.

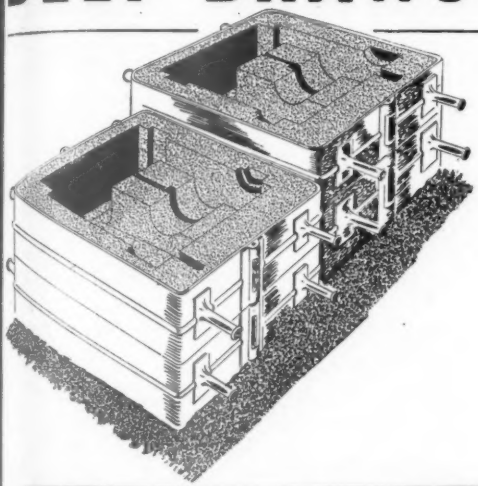
MR. ALICK S. DICK, managing director of the Standard Motor Company, Limited, Coventry, has left for Australia with Mr. W. J. R. Warren, Standard's director of export sales. They are to investigate future prospects of what has been the firm's best overseas market since the war. Mr. Dick also plans to discuss Standard Motors' plans at Coventry with his co-directors of the Australian company. Standard Motor Products, Limited, of Australia, recently announced an expansion programme involving the expenditure of a considerable sum to develop the production of engines and components in Australia for the complete range of Standard vehicles. Mr. Dick is also to visit New Zealand where the firm is just beginning to operate on a larger scale, and is now assembling cars from components made in Coventry.

COMPRESSION IGNITION, LIMITED, a subsidiary of Sheepbridge Engineering, Limited, was originally formed to carry out research and consultation work in the Diesel-engine field. Amongst the successful projects carried out was the development of a small pumpless Diesel engine which eliminates the need for expensive fuel injection equipment and thus greatly reduces maintenance costs. This work was augmented by the development of the Twiflex range of mechanical power-transmission couplings, combining extreme flexibility with robust construction and many thousands of these couplings are at work in all parts of the world transmitting up to several thousand horse-power. To emphasize the company's future policy of providing a comprehensive power-transmission service it has been decided to change the name to Twiflex Couplings, Limited.

TWO INQUESTS were held on January 26 at West Bromwich on former moulders whose deaths were brought about by pneumoconiosis. Councillor Leeson complained that for six years the union had been trying to secure regular chest X-ray examinations of all foundry workers but they were frustrated by a maze of official red tape. The deputy Borough Coroner, Mr. A. Clark, said the co-operation of the employers as well as the employees was needed. If facilities could be granted by employers for examinations, he was sure it would greatly reduce the incidence of the disease. The inquests were on John Berrow (57), who had been a moulder for more than 40 years and was said to have died from congestive heart failure due to simple pneumoconiosis, and on Thomas William Clarke (62), who had been a moulder since leaving school, but had given up the work ten years ago for a lighter job.

AT THE ANNUAL MEETING in Birmingham on January 25 of the Council of the British Cycle and Motor Cycle Manufacturers' Union, it was reported that there was a marked increase in the production of bicycles last year, and the total was expected to exceed 3,150,000 against 2,996,000 in 1953. Exports also showed a rise and their value for the first nine months of 1954 exceeded that for the same period in 1953 by more than £1,300,000. The figure for last year was estimated at 2,100,000. There was a steady increase in motor-cycle production also, and it was expected that the figure here would be about 190,000, a record for the industry. The previous highest figure was 171,730 in 1951. The 1953 figure was 152,935. Exports were likely to be about 76,000 machines which would be the second highest export figure achieved. The industry was expected to achieve a record home sales figure exceeding 100,000 machines compared with 89,800 in 1953. Eighteen per cent. of the two industries' exports at present go to America and Canada it was stated. This compared with an average of 12 per cent. for all other exporting industries. There has been a very steady increase in the smaller capacity lightweight motor cycle and in the motorized bicycle the report states.

DEEP DRAWS . . .



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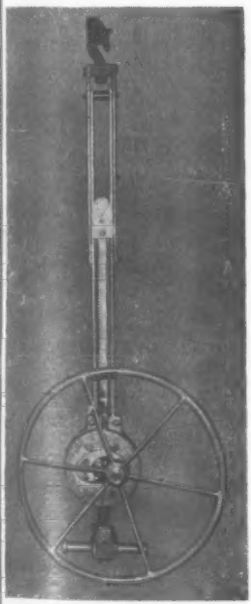

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Personal

Mr. G. R. BUCKLEY, general works manager, has now been appointed a director of Stanton Ironworks Company, Limited.

Mr. J. K. BROWN, director of research of the English Electric Company, Limited, was the guest of honour at the tenth annual dinner of the Stafford Chemical Society.

Mr. BRYAN DONKIN, B.A. (Cantab), M.I.E.E., has been elected president of The Engineers' Guild, and Mr. I. A. CURREY, A.M.I.MECH.E., the chairman of the Council.

Mr. C. WATTS, B.A., B.SC., has been appointed sales manager (foundry) of the Distington Engineering Company, Limited, Workington, with effect from February 1.

Mr. MORRIS APPLEGATE, has been appointed general manager of Herbert Alexander and Company, Limited, engineers, Leeds. He was formerly production controller at Sheepbridge Equipment, Limited.

Mr. GEORGE YARROW, factory superintendent with Babcock & Wilcox, Limited, Renfrew, has retired after more than 30 years' service. Employees and friends presented him with a wallet of notes.

COUNCILLOR LEONARD KIRK, who prior to retirement in 1945 was a moulder for 40 years at Gummers, Limited, brassfounders, Effingham Brass Works, Rotherham, has been named as the next Mayor of the town.

Mr. JOHN R. STANIFORTH, who has been elected a director of Costain-John Brown, Limited, of London, was formerly with Thos. Firth & John Brown, Limited, in Sheffield, from 1933 to 1949 as progress manager at the Atlas and Norfolk works.

Mr. K. H. WRIGHT, F.I.M., has resigned his position as technical director of Midland Rollmakers, Limited, Crewe, to take up the post of director (sales, management and technical) with the foundry section of Johnsons Iron & Steel Company, Limited, West Bromwich.

Mr. H. L. SATCHELL, a director since 1949, has been appointed deputy director of manufacture of the British Thomson-Houston Company. Mr. H. F. COX, manager of the company's Willesden works since 1946, will succeed Mr. Satchell as manager of B.T.-H. Rugby works on March 1.

Mr. HANDEL DAVIES has been appointed scientific adviser to the Air Ministry with the agreement of the Ministry of Supply. Since 1952 Mr. Davies, who is 42, has been serving as chief superintendent at the Aeroplane and Armament Experimental Establishment at Boscombe Down.

NORTHERN ALUMINIUM COMPANY, LIMITED, announce the appointments of Mr. B. N. H. THORNELY (a director) as secretary of the company, in addition to his present duties; Mr. E. A. TRIGG, formerly with Aluminum Company of Canada, Limited, as chief financial officer; and Mr. J. MASON, formerly assistant treasurer, as chief accountant.

Mr. ERNEST MARVILL, general manager of the Sheepbridge Company, Limited, has been appointed to the board of the company, which is now a wholly owned subsidiary of the Staveley Iron and Chemical Company, Limited. Both come under the control of the Iron and Steel Holding and Realization Agency. Mr. Marvill will retain his position as general manager.

THE EXPORT CREDITS GUARANTEE DEPARTMENT (the Government department providing insurance against the major risks of export-trading) announces that the President of the Board of Trade has appointed Mr. R. W. BURKITT to the newly-created post of deputy comptroller-general of the department. Mr. Burkitt has been an assistant secretary in the Board of Trade.

Obituary

Mr. PERCIVAL HAROLD SAUNDERS, chief smoke abatement officer to the City of Liverpool, has died at the age of 52.

Mr. WILLIAM FRANCIS FURSE, chairman of W. J. Furse & Company, Limited, electrical engineers, Nottingham, has died at the age of 70. He was a past-president of the Nottingham Society of Engineers.

Mr. FREDERICK WILLIAM CLAPHAM, executive director of Clapham Bros., Limited, gas-plant makers, of Keighley, Yorks, died on February 1 at the age of 73. He was also a director of John Lund, Limited, machine-toolmakers.

THE DEATH has occurred of Mr. RICHARD BOWNESS HODGSON, a former managing director of Whessoe, Limited, gas-plant engineers, etc., of Darlington. Mr. Hodgson, who was 88, began his career in the shipping industry in Cumberland, later becoming general manager of the Workington Bridge & Boiler Company, Limited. In 1907 he joined Ashmore, Benson, Pease & Company, Stockton-on-Tees, as works manager, and was subsequently appointed general manager and a director of that company and of the Power-Gas Corporation, Limited. Mr. Hodgson was managing director of Whessoe, Limited, from 1925 to 1935, when he retired, although he remained on the board for some time.

THE DEATH occurred last week of Mr. JAMES ERNEST SMETHURST, J.P., joint managing director of James Smethurst and Son, Limited, Warrington. He was 57 years old. On leaving Giggleswick School, he joined the family business which was established in 1725 and is thus amongst the oldest foundry concerns in the country. When the company was registered as a limited-liability concern, Mr. Smethurst became managing director. He was a past-president of the Manchester and District Ironfounders' Employers' Association and prominent in the affairs of Engineering and Allied Employers' Federation. He was also a member of the Institute of British Foundrymen. In the 1914-18 war, he served in the territorial army, retiring with the rank of major. During the last war he saw service with the Home Guard. His wise counsel will be greatly missed in foundry employer circles.

Sir MAURICE DENNY, president of William Denny & Bros., Limited, the Dumbarton shipbuilding concern, which constructed the Cutty Sark and collaborated in the production of the Denny-Brown stabilizer for ships, died on February 2, a few days before his 69th birthday. Sir Maurice was the eldest son of Sir Archibald Denny, first baronet, and grandson of Peter Denny, one of the founders of the family business. After spending four years in the United States at the Massachusetts Institute of Technology, he began his career with William Doxford & Sons, Limited, at Sunderland, and then gained further practical experience in the family shipyard. In 1911 he became a partner in the firm, and, when it was converted into a limited company in 1918, was appointed a director, becoming vice-chairman in 1920 and chairman in 1922. He retired as chairman in 1952, but was invited by the board to become president.

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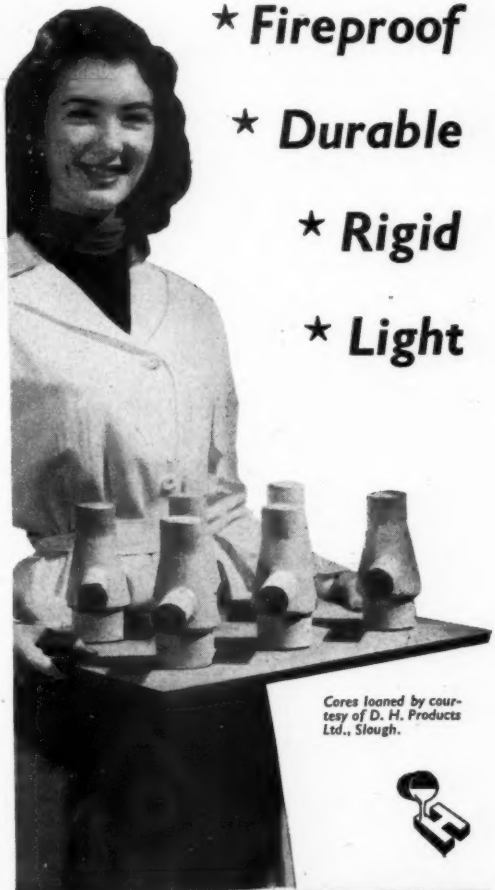

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Raw Material Markets

Iron and Steel

The furnaces are now overcoming the difficulties caused by bad weather, both in regard to deliveries of raw materials and production. Outputs are expected to improve and deliveries to conform to analyses more in keeping with the requirements of the foundries.

The demand from the foundries for pig-iron shows, if anything, an upward trend. Most consumers are entirely dependent on current deliveries, stocks having been liquidated. Few producers, however, are able to step up deliveries. Current outputs do not permit of any appreciable increase in the tonnages supplied. This position applies particularly to the low- and medium-phosphorus irons, and many of the engineering foundries are still exploring the possibilities of obtaining supplies of imported iron, even if this entails a higher price, as there appears to be no likelihood of any improvement in the supply from home sources in the near future; in fact, the position will probably become worse. The shortage of this grade has increased the demand for hematite and refined irons, and there has been a much wider call for available supplies of Scotch foundry pig-iron from the foundries in the English Midlands and further south. In some producing areas hematite is very scarce, as a large proportion of the output is supplied to the steelworks.

The engineering and speciality foundries continue to be very busy, and any slackness in production is due mainly to shortage of pig-iron and scrap. Much improved trading conditions are reported from the light and textile foundries, while the jobbing foundries, in general, are enjoying brisk demands for their castings. Improved outputs of high-phosphorus pig-iron are now expected. but some makers have not yet overtaken their arrears of orders.

Most grades of scrap are scarce, the position being worse in some areas than others. The foundries in the Birmingham and Staffordshire areas are very short of heavy cast-iron and machinery scrap.

Supplies of foundry and heating cokes are generally adequate for current needs, but deliveries of Welsh foundry coke are behind schedule in some brands. Ganister, limestone, and firebricks are available to requirements.

The demand for semi-finished and finished steel is fully maintained and the increased production is quickly absorbed.

Non-ferrous Metals

Exciting conditions prevailed on the Metal Exchange last week. Interest centred on copper, which staged a spectacular rise as a result of what appeared once or twice to be near panic buying on the part of operators, leaving short positions open and unprotected. On balance cash advanced by no less than £40 to £356, while three months was up by £32 to £331, the backwardation widening to £25. The squeeze for the cash position was acute; production in Northern Rhodesia, although maintained at a modest level, is a long way below normal. Reports from Northern Rhodesia give some grounds for optimism, however, since African mine labour is being engaged, it is suggested, at the rate of about 300 men a day.

Britain depends very much on Rhodesian copper and the present situation is extremely serious for the non-ferrous industry, which may well find itself uncomfortably short of copper during the second quarter of this year. Fortunately, copper is coming forward from Canada and Chile in fairly good quantities, but there is no gainsaying the importance of Rhodesia as our bulk supplier.

In the United States the domestic price remains at 33 cents, but consumers are paying far in excess of this figure for supplies of much needed metal. So tight is the position that the US Government has temporarily suspended the issuing of export licences for copper and this fact has added impetus to the inflationary trend on the London market.

Another factor making for firmness has been the situation in the Far East. Tin has, of course, been much affected by this trouble, and last week saw an advance of £17 in cash and of £16 10s. in three months. Trading was fairly brisk. To a lesser extent both lead and zinc were affected by the crisis. Lead, more in evidence than some weeks ago, gained £1 for February and 25s. for May, closing with a backwardation of 5s. Zinc closed at £91 15s., a gain of 15s. in February metal, while May advanced by £1 to £89 5s. Scarcity of supplies is causing the retention of the backwardation, which at the close of business last Friday stood at £2 10s.

Official metal prices were as follow:—

COPPER, Standard—*Cash:* February 3, £337 10s. to £342 10s.; February 4, £345 to £347 10s.; February 7, £337 10s. to £340; February 8, £347 10s. to £350; February 9, £357 10s. to £360.

Three Months: February 3, £316 to £317; February 4, £321 to £322 10s.; February 7, £317 10s. to £320; February 8, £330 to £332; February 9, £341 to £342.

TIN, Standard—*Cash:* February 3, £709 to £710; February 4, £723 to £724; February 7, £719 to £720; February 8, £715 to £716; February 9, £721 to £722.

Three Months: February 3, £710 to £711; February 4, £723 to £724; February 7, £720 to £721; February 8, £718 to £720; February 9, £723 to £724.

ZINC—*First half February:* February 3, £90 to £90 10s.; February 4, £91 to £91 10s.; February 7, £90 10s. to £91; February 8, £90 10s. to £91; February 9, £90 10s. to £91.

First half May: February 3, £87 15s. to £88; February 4, £88 15s. to £89 5s.; February 7, £88 5s. to £88 10s.; February 8, £88 to £88 10s.; February 9, £88 to £88 10s.

LEAD—*First half February:* February 3, £104 10s. to £104 15s.; February 4, £105 15s. to £106; February 7, £104 15s. to £105; February 8, £104 10s. to £104 15s.; February 9, £104 5s. to £104 10s.

First half May: February 3, £104 10s. to £105; February 4, £105 10s. to £105 15s.; February 7, £105 to £105 5s.; February 8, £104 15s. to £105; February 9, £104 10s. to £105.

Steel Prices

The Iron and Steel Board announce that increases have been made in the maximum prices of alloy steels containing nickel, molybdenum or tungsten owing to the higher cost of these materials; price increases vary according to the alloy content. The prices of some stainless steels and some of the alloy qualities of shell steel and forging ingots have been increased for the same reason. The new prices came into force on Monday last.

CLEANING OF CASTINGS: It is regretted that, in recording a correction last week to Mr. Childe's Paper on the above subject, the name of his firm, H. G. Sommerfield, Limited, was wrongly spelled.

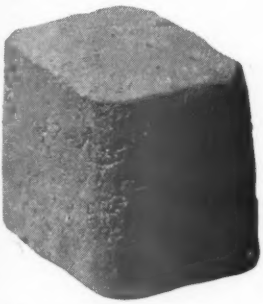
F.&M.

REGD. TRADE MARK

SILICON AND MANGANESE BRIQUETTES

FOR SOFTENING AND REFINING CAST IRON

F. & M. SILICON BRIQUETTE



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For the past fourteen years, F. & M. Supplies Ltd. have provided in their Ferro Silicon Briquettes a practical, convenient and economical means of increasing the amount of silicon in a cast iron. The necessary number of Briquettes is added to the charge in the cupola and all the silicon contained in the briquettes passes into the molten metal with only a negligible loss because the alloy is protected during its progress through the oxidizing zone. An important function of F. & M. Silicon Briquettes is the production of dense iron castings.

Many cupola charges require the addition of manganese to combine with the sulphur and form the comparatively innocuous manganese sulphide. Manganese is also needed in the production of cast iron having a medium tensile strength and is essential when a steel scrap is incorporated in the charge.

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Manufacturers also of:

SILICOMANGANESE AND FERRO CHROMIUM BRIQUETTES

Current Prices of Iron, Steel, and Non-ferrous Metals

(Delivered unless otherwise stated)

February 9, 1955

PIG-IRON

Foundry Iron.—No. 3 IRON, CLASS 2:—Middlesbrough, £15 12s. 0d.; Birmingham, £15 5s. 3d.

Low-phosphorus Iron.—Over 0.10 to 0.75 per cent. P, £17 13s. 9d., delivered Birmingham. Staffordshire blast-furnace low-phosphorus foundry iron (0.10 to 0.50 per cent. P, up to 3 per cent. Si), d/d within 60 miles of Stafford, £18 9s. 3d.

Scotch Iron.—No. 3 foundry, £18 2s. 3d., d/d Grangemouth.

Cylinder and Refined Irons.—North Zone, £20 4s. 0d.; South Zone, £20 6s. 6d.

Refined Malleable.—P, 0.10 per cent. MAX.—North Zone, £21 1s. 6d.; South Zone, £21 4s. 0d.

Hematite.—Si up to 2 per cent., S. & P. over 0.03 to 0.05 per cent.:—N.-E. of England (local iron), £18 2s. 6d.; Scotland (Scotch iron), £18 9s. 0d.; Sheffield, £19 7s. 6d.; Birmingham, £19 14s. 6d.; Wales (Welsh iron), £18 9s. 0d.

Basic Pig-iron.—£15 15s. 6d. all districts.

FERRO-ALLOYS

(Per ton unless otherwise stated, delivered)

Ferro-silicon (6-ton lots).—40/55 per cent., £40 15s. 0d., basis 45 per cent. Si, scale 15s. per unit; 70/84 per cent., £63 0s. 0d., basis 75 per cent. Si, scale 16s. per unit.

Ferro-vanadium.—50/60 per cent., 23s. 8d. to 25s. 0d. per lb. of V.

Ferro-molybdenum.—65/75 per cent., carbon-free, 11s. 0d. per lb. of Mo.

Ferro-titanium.—20/25 per cent., carbon-free, £161 0s. 0d. to £165 0s. 0d. per ton; 38/40 per cent., £258 0s. 0d. to £262 0s. 0d. per ton.

Ferro-tungsten.—80/85 per cent., 17s. 2d. per lb. of W.

Tungsten Metal Powder.—98/99 per cent., 20s. 2d. per lb. of W.

Ferro-chrome (6-10 ton lots).—4/6 per cent. C. £78 0s. 0d. to £80 0s. 0d., basis 60 per cent. Cr, scale 25s. 0d. per unit; over 6 per cent. C, £76 0s. 0d. to £78 0s. 0d., basis 60 per cent. Cr, scale 24s. 0d. per unit; 2 per cent. C,* 1s. 8½d. per lb. Cr; 1 per cent. C,* 1s. 9d. per lb. Cr; 0.15 per cent. C,* 1s. 10½d. per lb. Cr; 0.10 per cent. C,* 1s. 10¾d. per lb. Cr; 0.06 per cent. C,* 1s. 11d. per lb. Cr.

Metallic Chromium.—98/99 per cent., 6s. 6½d. to 7s. 1d. per lb.

Metallic Manganese.—93/95 per cent., carbon-free, £225 0s. 0d. to £232 0s. 0d. per ton; 96/98 per cent., £255 0s. 0d. to £262 0s. 0d. per ton.

Ferro-columbium.—60/75 per cent., Nb + Ta, 52s. 6d. to 70s. 0d. per lb., Nb + Ta.

Ferro-manganese (home).—78 per cent., £54 15s. 0d.

SEMI-FINISHED STEEL

Re-rolling Billets, Blooms, and Slabs.—BASIC: Soft, u.t., £25 5s. 0d.; tested, 0.08 to 0.25 per cent. C, £26 5s. 0d.; hard (0.41 to 0.60 per cent. C), £27 10s. 0d.; silico-manganese, £34 10s. 0d.; free-cutting, £29 6s. 6d. SIEMENS MARTIN ACID: Up to 0.25 per cent. C, £32 17s. 0d.; silico-manganese, £34 10s. 0d.

Billets, Blooms, and Slabs for Forging and Stamping.—Basic, soft, up to 0.25 per cent. C, £29 13s. 6d.; basic, hard, over 0.41 up to 0.60 per cent., C, £30 16s. 0d.; acid, up to 0.25 per cent. C, £33 15s. 0d.

FINISHED STEEL

Heavy Plates and Sections.—Ship plates (N.-E. Coast), £31 1s. 6d.; boiler plates (N.-E. Coast), £33 11s. 6d.; floor plates (N.-E. Coast), £32 10s. 6d.; sectional material, N.-E. Coast, £29 4s. 6d.

Small Bars, Sheets, etc.—Rounds and squares, under 3 in., untested, £31 19s. 6d.; flats, 5 in. wide and under, £31 19s. 6d.; hoop and strip, £33 1s. 6d.; uncoated strip mill coils, hot rolled, under 3mm. to 12g., £34 5s. 0d.; black sheets (hand mill), 17/20 g., £43 13s. 6d.; galvanized corrugated sheets, 24 g., £54 17s. 0d.

Alloy Steel Bars.—1 in. dia. and up: Nickel, £54 7s. 0d.; nickel-chrome, £76 7s. 9d.; nickel-chrome-molybdenum, £86 8s. 6d.

NON-FERROUS METALS

Copper.—Cash, £357 10s. 0d. to £360 0s. 0d.; three months, £341 0s. 0d. to £342 0s. 0d.; settlement, £360 0s. 0d.

Copper Tubes, etc.—Solid-drawn tubes, — per lb.; wire, — per cwt. basis; 20 s.w.g., — per cwt.

Tin.—Cash, £721 0s. 0d. to £722 0s. 0d.; three months, £723 0s. 0d. to £724 0s. 0d.; settlement, £722 0s. 0d.

Zinc.—First half February, £90 10s. 0d. to £91 0s. 0d.; first half May, £88 0s. 0d. to £88 10s. 0d.

Zinc Sheets, etc.—Sheets, 15 g. and thicker, all English destinations, £121 5s. 0d.; rolled zinc (boiler plates), all English destinations, £119 0s. 0d.; zinc oxide (Red Seal), d/d buyers' premises, £103 0s. 0d.

Lead (Refined Pig).—First half February, £104 5s. 0d. to £104 10s. 0d.; first half May, £104 10s. 0d. to £105 0s. 0d.

Brass Tubes, etc.—Solid-drawn tubes, — per lb.; rods, drawn, — ; sheets to 10 w.g., — per cwt.; wire, — ; rolled metal, — per cwt.

Brass (Brazing).—BS1400, B3 (65/35), £216; B6 (85/15), £300; BS249, £250.

Brass (High Tensile).—BS1400, HTB1 (30 tons), £200; HTB2 (30 tons), £270; HTB3 (48 tons), £285.

Gunmetal.—RCH, 3/4 per cent. tin, —; BS1400, LG2 (85/5/5/5), £283; LG3 (86/7/5/2), £292; G1 (88/10/2/½), £368; (88/10/2/1), £355.

Phosphor Bronze.—BS1400, PB1 (AID released), £383 per ton.

Phosphor Bronze Strip, etc.—Strip, — per cwt.; sheets to 10 w.g., — per cwt.; wire, — per lb.; rods, — ; tubes, — ; chill cast bars: solids — , cored — (CHARLES CLIFFORD, LIMITED.)

Nickel Silver, etc.—Rolled metal, 3 in. to 9 in. wide × 0.056, 3s. 11½d. per lb.; round wire, 10g. in coils (10 per cent.), 4s. 4½d.; special quality turning rod, 10 per cent., ½ in. dia., in straight lengths, 4s. 3½d. All prices are net.

Other Metals.—Magnesium, ingots, 2s. 3d. per lb. Antimony, English, 99 per cent., £210 0s. 0d. Quicksilver, ex-warehouse, £108 10s. 0d. to £110 0s. 0d. Nickel, £519 0s. 0d. Aluminium, ingots, £163 0s. 0d.; aluminium bronze (BS1400), AB1, £334; AB2, £340. Solder, brazing, BS1845, 2s. 6d. lb.; granulated, 2s. 9d. lb.

* Average 68-70 per cent. Cr.